

**MON2000**  
**Software for Gas Chromatographs**

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**User Manual**

**Applies to Both:**  
**Daniel Danalyzer On-Line Gas Chromatographs**  
**Rosemount Analytical Process Gas Chromatographs**

**Part Number 3-9000-522**

**Revision R**  
**JULY 2010**





# **MON2000 Software for Gas Chromatographs Manual**

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## IMPORTANT INSTRUCTIONS

- Read all instructions prior to installing, operating, and servicing this product.
- Follow all warnings, cautions, and instructions marked on and supplied with this product.
- Inspect the equipment packing case and if damage exists, notify your local carrier for liability.
- Open the packing list and carefully remove equipment and spare or replacement parts from the case. Inspect all equipment for damage and missing parts.
- If items are damaged or missing, contact the manufacturer at 1 (713) 827-6314 for instructions about receiving replacement parts.
- Install equipment as specified per the installation instructions and per applicable local and national codes. All connections shall be made to proper electrical and pressure sources.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent personal injury.
- Use of this product for any purpose other than its intended purpose may result in property damage and/or serious injury or death.
- Before opening the flameproof enclosure in a flammable atmosphere, the electrical circuits must be interrupted.
- Repairs must be performed using only authorized replacement parts as specified by the manufacturer. Use of unauthorized parts can affect the product's performance and place the safe operation of the product at risk.
- When installing or servicing ATEX-certified units, the ATEX approval applies only to equipment without cable glands. When mounting the flameproof enclosures in a hazardous area, only flameproof cable glands certified to IEC 60079-1 must be used.
- Technical assistance is available 24 hours a day, 7 days a week by calling 1 (713) 827-6314.

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## INTRODUCTION

Welcome to the MON2000 *User Manual* (P/N 3-9000-522), a user guide that accompanies the MON2000 software produced by Daniel Measurement and Control, Inc., a Division of Emerson Process Management.

Use this manual for installing the MON2000 and Modbus Test (WinMB) software programs, getting started, checking various gas chromatograph (GC) application settings, and configuring and monitoring your GC system.

### 1.1 DESCRIPTION OF MANUAL

See the following section summaries or the Table of Contents for more information.

#### Section 1 – Introduction

This section includes:

- summary listing of the manual sections
- description of the MON2000 User Guide online help file
- description of the MON2000 software program

## **Section 2 – Installation and Startup**

This section includes:

- short description of the MON2000 software
- minimum system requirements for installing MON2000 on a 32-bit Microsoft® Windows® platform
- installation and Startup instructions
- establishing communications and Logon procedures
- instructions for customizing MON2000 and setting up security
- instructions for downloading an application and using the Offline Edit function to change an application's configuration

## **Section 3 – Getting Started**

This section includes:

- instructions on how to log on and log off
- navigation instructions for MON2000
- listing of available procedures and keyboard shortcuts
- access and navigation instructions for the MON2000 User Guide online help file

## **Section 4 – Control Functions**

This section includes:

- description of available Control functions and detailed step procedures

## **Section 5 – Application Functions**

This section includes:

- description of available GC Application functions and detailed step procedures

## **Section 6 – Chromatogram Viewer**

This section includes:

- description of available Chromatogram Viewer functions and detailed step procedures to view, save, and print chromatograms

## **Section 7 – Reports**

This section includes:

- descriptions of available reports and sample outputs
- instructions on how to generate and print a given report

## **Section 8 – Logs**

This section includes:

- description of Maintenance, Alarm, and Event logs
- description of the Parameter List
- step procedures for viewing, editing, and clearing logs

## **Section 9 – Data Collection**

This section includes:

- descriptions of Data Collection and Auto-Sequencing
- instructions on how to configure, generate and run the Data Collection and Auto-Sequencing function using MON2000 PLUS

## **Section 10 – Modbus Test**

This section includes:

- short description of the WinMB software
- minimum system requirements for installing WinMB on a 32-bit Microsoft® Windows® platform
- installation and start up instructions
- description of available Modbus Test functions and detailed step procedures
- description of the WinMB online help file and navigation instructions

**Appendix A, PC Config Report**

This appendix provides a sample PC Config Report for reference only.

**Appendix B, Component Data Table**

This appendix provides two sample Component Data Tables for reference only.

**Appendix C, Data Computations**

This appendix discusses the various equations and computations involved with acquisition and analysis tasks.

**Appendix D, Analog Output  
Cal. 2350A GC**

This appendix demonstrates how to calibrate an analog output for a 2350A GC Controller, using the MON2000 software.

**Appendix E, Upgrade 2350A GC  
S/W and 2350 EPROMS**

This appendix describes how to upgrade the GC software and the 2350 GC Controller EPROMS, the 2350A WinSystems CPU, P/C104 Bus, and DiskOnChip.

**Appendix F, Modbus Reg. List for 2350A GC**

This appendix explains the differences between SIM\_2251 and User\_Modbus protocols, and lists the corresponding Modbus registers used by the 2350A GC Controller.

## 1.2 DESCRIPTION OF ONLINE HELP

Use the User Guide online help file to quickly access information regarding any MON2000 function. See [Section 3.8](#) for more detailed information.

## 1.3 DESCRIPTION OF MON2000

MON2000 is a menu-driven, Windows-based software program designed to operate the gas chromatograph (GCs). MON2000 runs on an IBM-compatible personal computer (PC) and serves as an interface between you and the GC unit. MON2000 can run on a Windows® 95, Windows® 98, Windows® 2000, Windows® XP or Windows® NT operating system.

MON2000, combined with the GC application(s), offers a complete software package for operating and monitoring one or more GC systems from a single PC. MON2000 includes security features to help prevent unauthorized access to GC data or control. MON2000 also includes, for trouble-shooting purposes, an auxiliary program (WinMB) to selectively poll the GC Modbus registers (see [Section 10](#) for more information).

GC functions that can be initiated or controlled by MON2000 include:

- alarm parameters
- alarm and event processing
- analog scale adjustments
- analyses
- baseline runs
- calculation assignments and configurations
- calibrations
- component assignments and configurations

### NOTICE

**When configured for RS-485 multi-drop networking, MON2000 can interface with up to 32 GC units, either in a stand-alone configuration or via a network.**

**When configured for Ethernet networking MON2000 can interface with a number of GC Units limited only by the number of available TCP/IP addresses.**



- diagnostics
- event sequences
- halt operations
- stream assignments and sequences
- valve activations
- timing adjustments

Reports that can be generated by MON2000 per the GC application:

- 24-Hour Averages
- Analysis
- Calibration
- Final Calibration
- Hourly Averages
- Monthly Averages
- PC Configuration
- Raw Data
- Variable Averages
- Weekly Averages

Logs that are maintained by MON2000:

- Alarm Log
- Event Log
- Parameter List
- Maintenance Log

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## INSTALLATION AND SETUP

This section lists the system requirements to run MON2000 and provides installation procedures as well as initial logon instructions, communications setup, and software configuration.

### 2.1 SYSTEM REQUIREMENTS

To achieve maximum performance when running the MON2000 software, ensure your PC system contains the following hardware.

- PC with a 486/90MHz or higher processor (Pentium/100MHz or higher recommended) running either

Windows® 95 (service pack 1 or better) or later equipment and Microsoft® Windows® operating system.

#### **NOTICE**

Microsoft Internet Explorer 5.0 (or later) is required to view spreadsheets or reports saved in HTML format.

#### **NOTICE**

If running Windows® 95 with the 2350A optional Ethernet card, the user must download Socket 2 from [www.microsoft.com/windows95/downloads](http://www.microsoft.com/windows95/downloads) to utilize MON2000's ethernet feature.

- Windows® 98 version 1 or later
- Windows® 2000 version 1 or later
- Windows® XP version 1 or later (see note for system requirements)
- Windows® NT Server version 4 (service pack 3 or later)

## NOTICE

Use the **Settings > Control Panel > System/> General Page** menu to check the system version number.

For Windows® 95, the version number should be 4.00.950A/B or later.

For Windows® 98 or Windows® 2000, the version number should be 1 or later.

To use Windows® XP you need:

- Computer/Processor PC with 300 MHz or higher processor clock speed recommended;
- 233 MHz minimum required (single or dual processor system)
- \*Intel® Pentium®/Celeron™ family, or AMD-K6®/AMD Athlon™/AMD Duron™ family, or compatible processor recommended.
- Memory: 128 MB of RAM or higher recommended (64 MB minimum supported; may limit performance and some features).
- Hard Disk Minimum: 1.5 GB of available hard disk space.

For Windows® NT4, the version number should be 4.00.1381 or later.


- 16 megabytes (MB) of RAM (32 MB or higher recommended)
- 5 MB of free hard disk space
- Super VGA monitor with 800x600 resolution
- free serial port for remote/local connection to gas chromatograph (for online operations)
- free parallel port for connection to printer
- Windows® -compatible modem (for remote connection only)
- Ethernet connection (when using Ethernet networking)

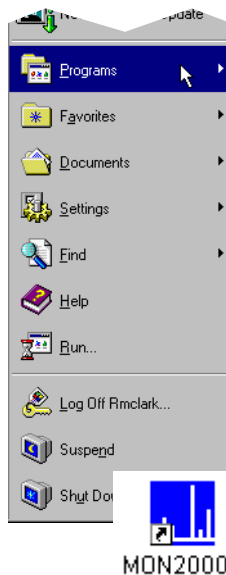
## 2.2 INSTALLING MON2000

To install MON2000, do the following:

### NOTICE

If you are upgrading MON2000, you must install the new software with same directory as the current version.

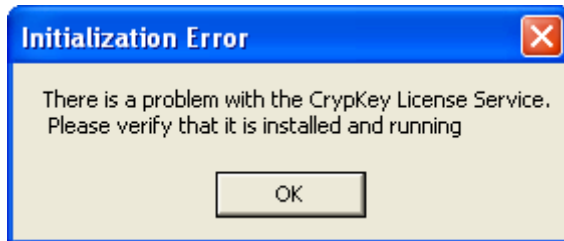
1. Either place the MON2000 CD in your CD-ROM drive or insert Installation Disk 1 into your floppy drive.
2. Launch Windows® Explorer® by either:
  - Clicking the  button (see the taskbar) to access the *Programs* menu option.
  - Double-clicking the Windows® Explorer® icon on your desktop.
3. Access either your CD-ROM drive or floppy drive.
4. Double-click the file “setup.exe”.
5. The Installation Wizard begins. Follow the instructions provided on each screen.



Upon successful installation, Windows® automatically creates a MON2000 icon on your desktop.

### 2.3 INSTALLING THE CRYPKEY LICENSE SERVICE FOR MON2000 PLUS

The CrypKey License Service must be installed on all NT-based systems. If you try to run MON2000 PLUS before installing the CrypKey License Service, an error will result.



To install the CrypKey License Service, do the following:

1. After installing MON2000 PLUS, the program folder should display automatically; if it doesn't, open Windows® Explorer® and access the MON2000 PLUS program folder.
2. Double-click the **SETUPEX.EXE** file.

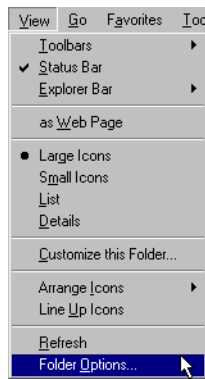
MON2000 PLUS can now be started. You have 30 days to evaluate the application. Once the trial period expires, you must obtain a license to continue to use MON2000 PLUS.

for more information, refer to the *MON2000 PLUS Quick Start Guide* (3-9000-743).

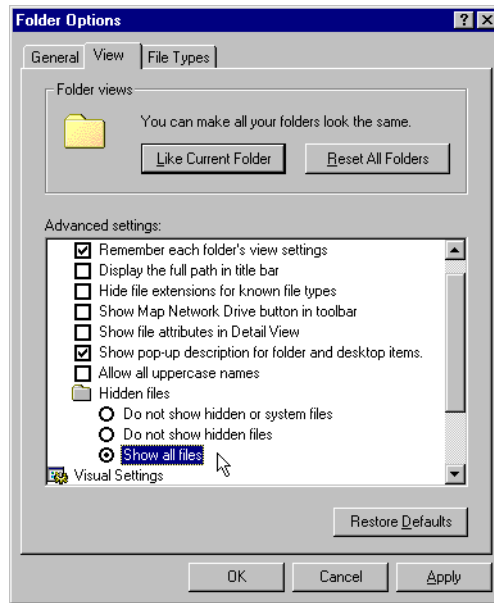
### 2.4 COPYING MON2000 TO DISKS


Use this procedure to copy the MON2000 installation files to 3 floppy disks for future installation.

1. Label 3 blank formatted 3.5-inch floppy disks “MON2000 Install Disk 1”, “MON2000 Install Disk 2”, and “MON2000 Install Disk 3”.
2. Place the MON2000 CD in your CD-ROM drive.
3. Launch Windows® Explorer®.
4. Ensure that the *Show all files* option in Windows® Explorer® is selected.

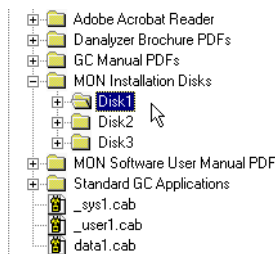


- (a) Use the *View > Folder Options* menu to access the Folder Options dialog.
- (b) Click the *View* tab.



- (c) In the Advanced Settings pane, find the gray folder icon labeled *Hidden Files*.
- (d) Click the *Show all files* radio button.
- (e) Click the  button.

5. Use the Windows® Explorer® directory tree to open the MON2000 *Installation Files* folder on your CD.
6. Place the “MON2000 Install Disk 1” in your floppy drive.



7. Open the *Disk1* folder on your CD.
8. Copy all files from the *Disk1* folder to the “MON2000 Install Disk 1” floppy.
9. Remove the “MON2000 Install Disk 1” from your floppy drive.
10. Repeat Steps 5 through 8 to copy the *Disk2* and *Disk3* folders to your “MON2000 Install Disk 2” and “MON2000 Install Disk 3” floppy disks.
11. Remove the MON2000 CD from your CD-ROM drive.

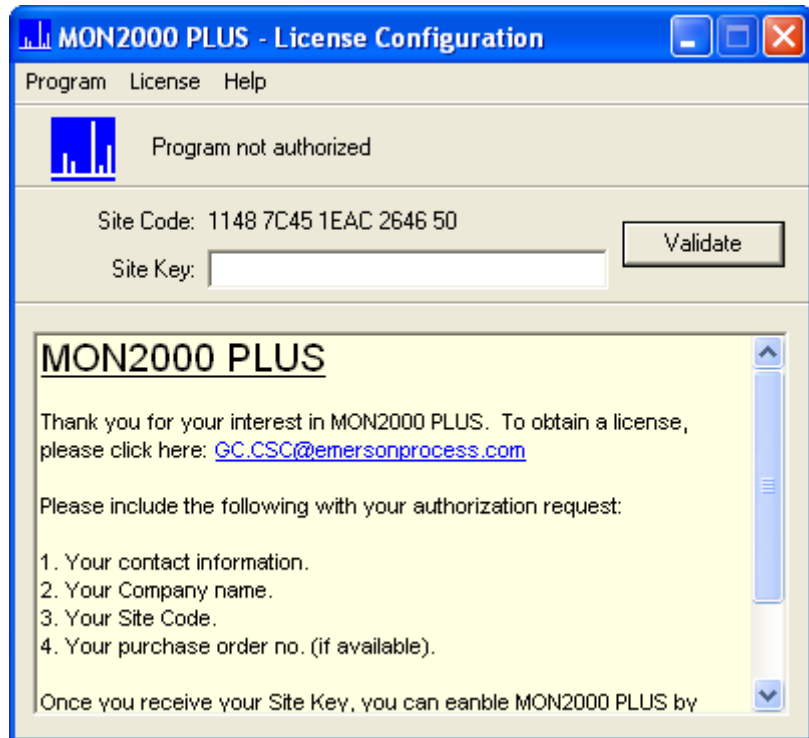
## 2.5 TRANSFERRING A MON2000 PLUS LICENSE

To physically transfer the license file from one computer to the other you will need a removeable storage medium such as a 3.5-inch floppy disk or a USB flash drive. Also, there must be a licensed version on MON2000 PLUS installed on the source computer and an unlicensed version of MON2000 PLUS on the targeted computer.

1. On the target computer, if using a floppy disk, insert it into the disk drive; if using a flash drive, insert it in to a USB slot.



2. Start MON2000 on the target computer.  
The *License Configuration* screen displays.



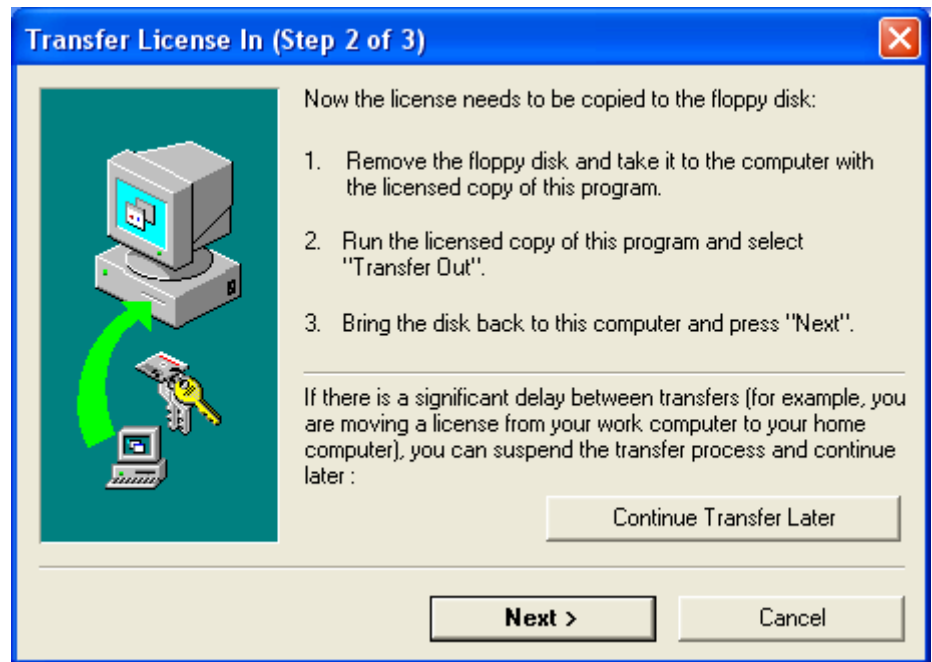
3. Select **Transfer in from another computer...** from the *License* menu. The

*Transfer License In (Step 1 of 3)* screen displays.



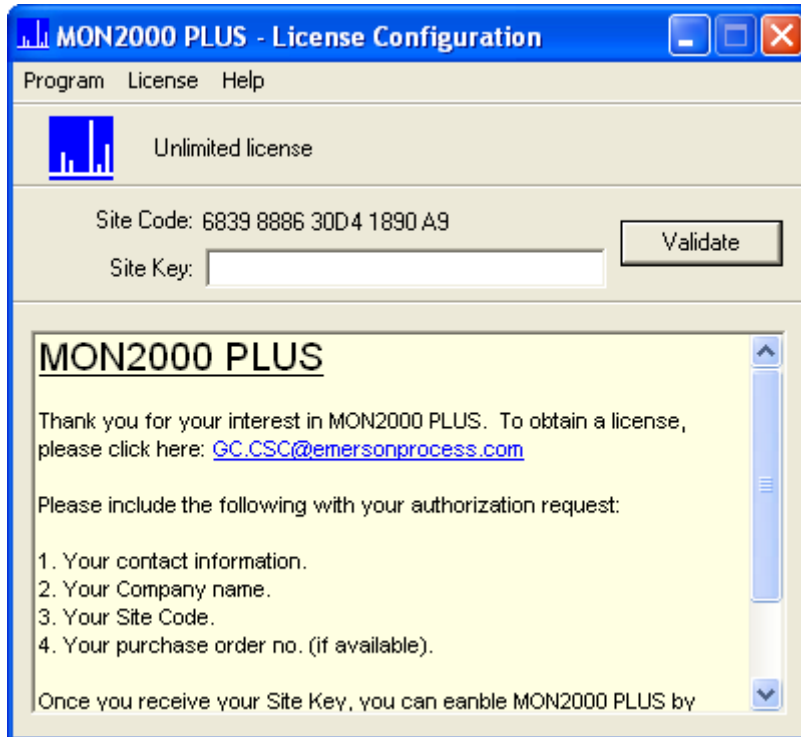
4. Click **Browse** to select a disk path to the removable storage medium that holds the license file. Click **OK** to accept your selection.

5. Click **Next**. The *Transfer License In (Step 2 of 3)* screen displays.



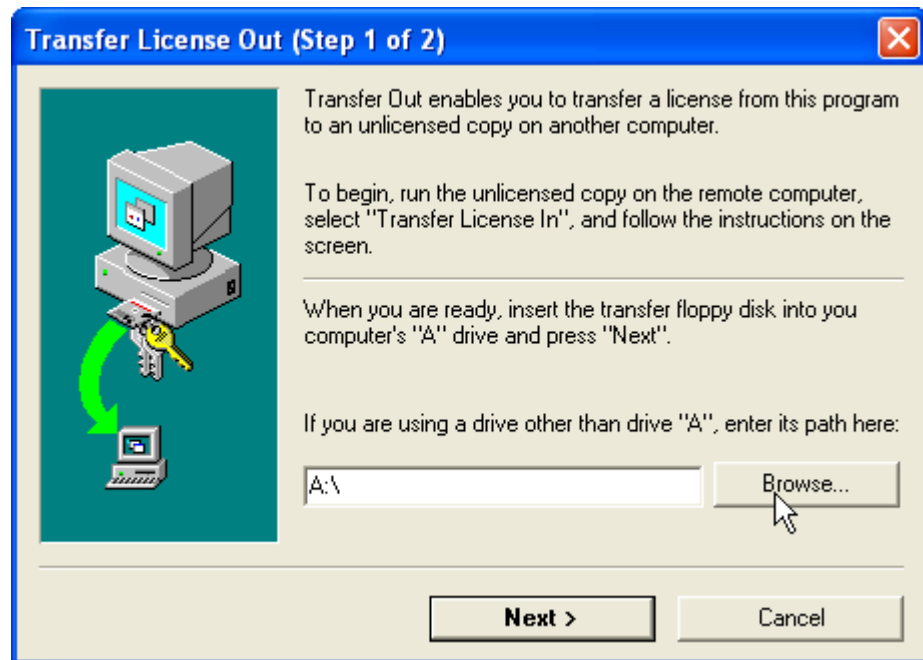
6. Remove the removable storage medium from the targeted computer and insert it into the source computer.
7. Launch MON2000 PLUS on the source computer. When the startup screen displays, press **Enter**. The *License*

*Configuration* screen displays with the message “Unlimited license”.



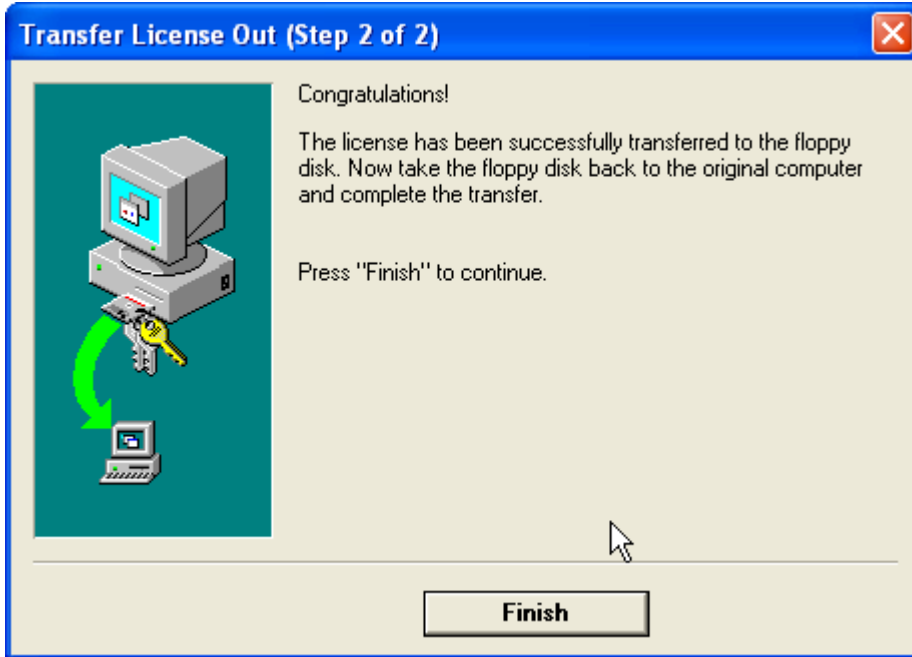
8. Select **Transfer out to another computer...** from the *License* menu of the

*License Configuration* screen. The *Transfer License Out (Step 1 of 2)* screen displays.

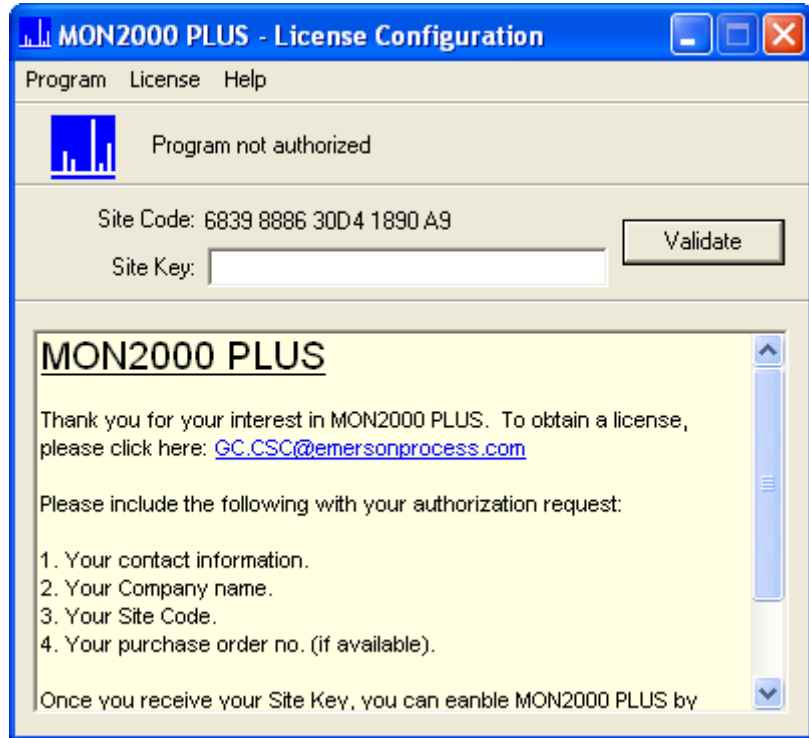


9. Click **Browse** to select a disk path to the removeable storage medium that holds the license file. Click **OK** to accept your selection.

10. Click **Next**. The *Transfer License Out (Step 2 of 2)* screen displays.



11. Click **Finish**. MON2000 PLUS on the source computer is no longer licensed.



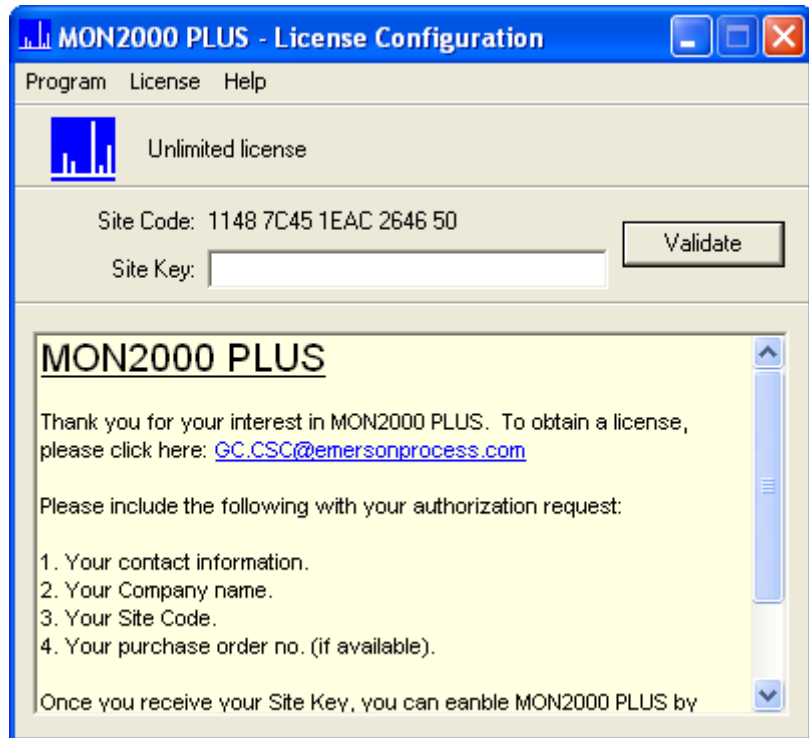
12. Remove the removable storage medium from the source computer and reinsert it into targeted computer.

13. On the targeted computer, click **Next** on the *Transfer License In (Step 2 of 3)* screen. The *Transfer License In (Step 3 of 3)* screen displays.






14. Click **Finish**. The *License Configuration* screen displays.



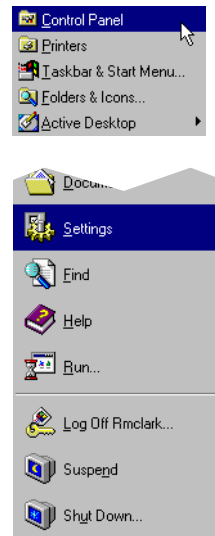
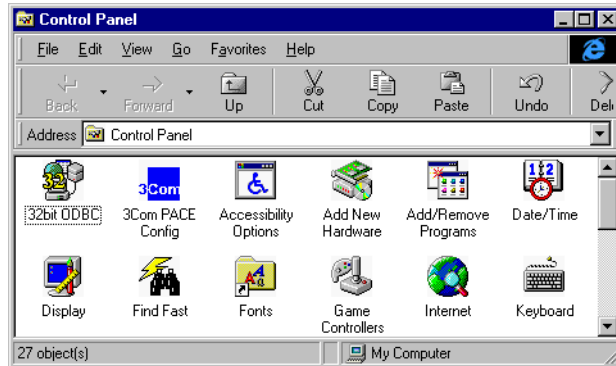
MON2000 PLUS is now licensed for unlimited use on the targeted computer.

## 2.6 UNINSTALLING MON2000

To uninstall MON2000 using Windows® 95, Windows® 98, Windows® 2000 or Windows® NT,

1. Click the  button (see the taskbar).

2. Click *Settings* and then *Control Panel*. The Control Panel dialog appears.

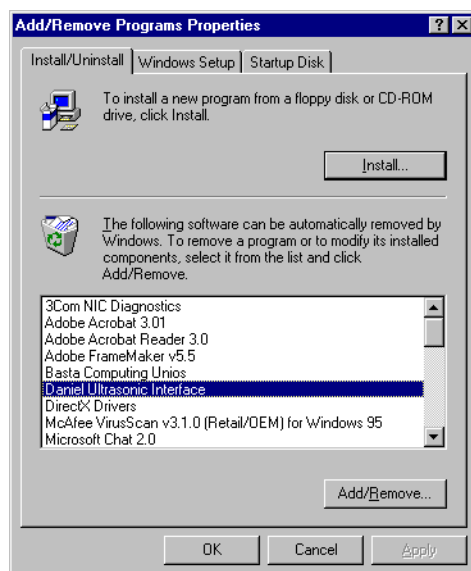


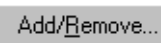
3. Double-click the *Add/Remove Programs* icon.

## NOTICE

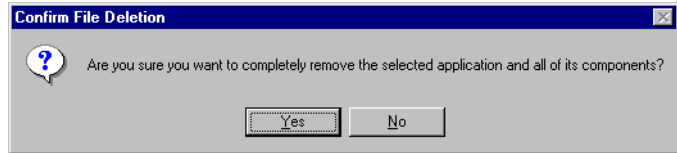
If using Windows XP, click the Start button, then Add/Remove Programs.

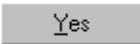
4. The Add/Remove Program Properties dialog appears.

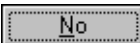


5. Select MON2000 and click the  button.

6. Windows® displays the following confirmation dialog.



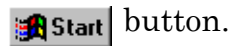
7. Click the  button to continue. Windows® deletes the program files only. Any files shared by other programs or created by the user are not deleted.

Click the  button to abort and return to the Add/Remove Program Properties dialog.

## 2.7 STARTING MON2000

To start MON2000 after a successful installation,

Use the Windows® Start menu (*Start > Programs > MON2000* menu) by clicking the



Double-click the MON2000 icon automatically created on your desktop during installation.

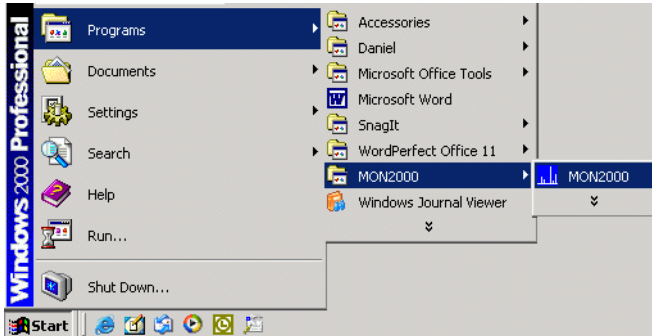


### NOTICE

**You cannot access the MON2000 functions until you are successfully logged on.**

To start MON2000 directly from the executable file, use the directory you specified when installing MON2000. Note that **c:\Program**

**Files\MON2000\MON2000** is the default setting.



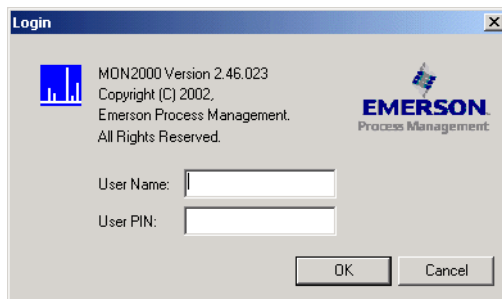
## 2.8 PERFORMING YOUR FIRST LOGON

### 2.8.1 The Initial Logon

Each new GC unit is shipped with one super user named “Emerson”. After logon, ensure that this user name appears in the Users list as a super user (see [Section 2.11.1](#)).

To log on for the first time,

1. Start the MON2000 software program by clicking the desktop icon or by using the Windows® Start menu (see [Section 2.7](#)).

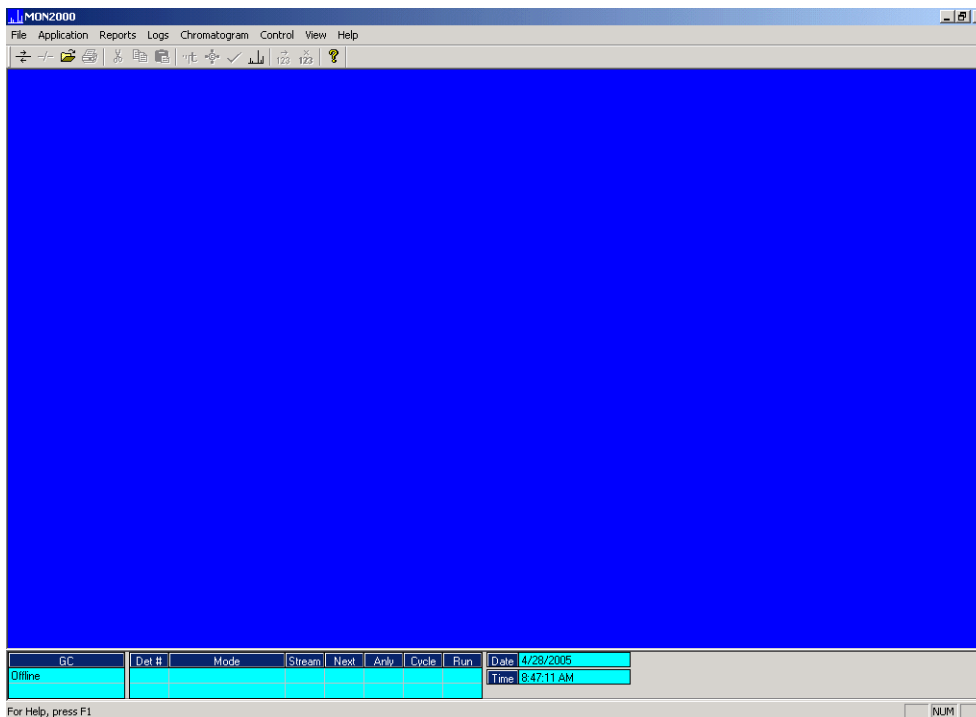


2. Click in the *User Name* data field.
3. Type **emerson**. Note that the user name is not case-sensitive.

## NOTICE

**A PIN is not required for the initial logon.**

4. When you have successfully logged on, the MON2000 main window appears.

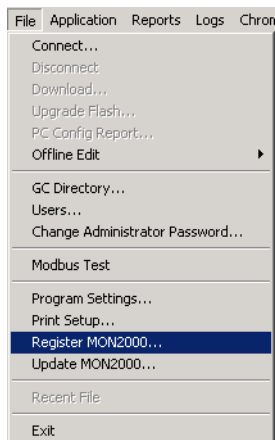


## 2.8.2 Registering MON2000

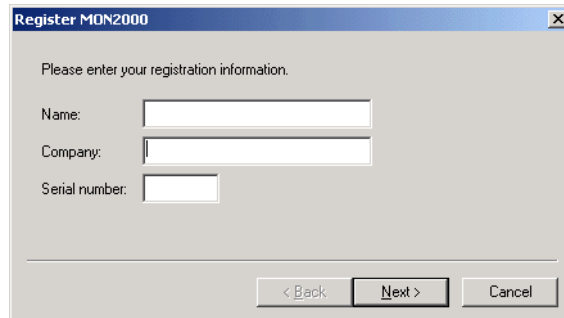
After you have successfully performed your initial logon (see Section 2.8.1), MON2000 automatically prompts you to register your copy of MON2000 software. An active Internet connection is required for registration.

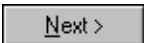
Registering your MON2000 software allows you to receive information about free updates and related products. A direct link to the Emerson Internet website is provided via the *File > Update MON2000* menu.

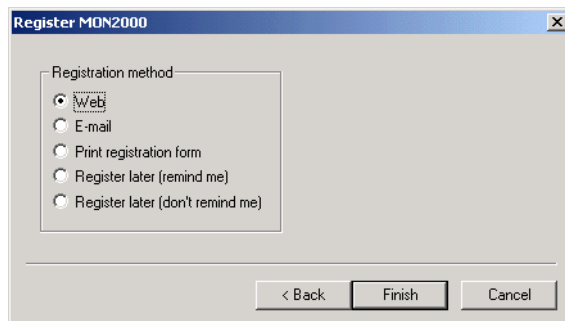
You may choose to postpone registration. You can register at any time via the *File > Register MON2000* menu.



1. Use the *File>Register MON2000* menu. Follow the prompts in the Register MON2000 dialog to input your name, MON2000 serial number (located inside the CD jewel case), and other relevant information.



2. Click the  button to continue.
3. Choose the desired registration method by clicking the corresponding radio button.



4. Click the  button.

## NOTICE

You must have an active internet connection to register via the website.

### 2.8.3 Update MON2000

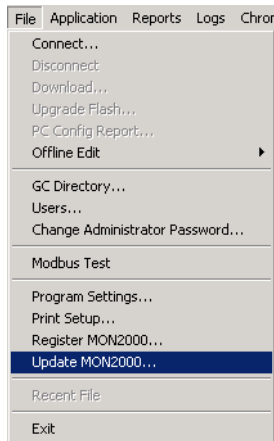
Provided there is an active internet connection to the computer on which MON2000 is installed, clicking the *File>Update MON2000* submenu sends the user to the Emerson<sup>®</sup> Chromatograph Controllers website ([www.emersonprocess.com/daniel/products/GC/Controllers/Productdetail.htm](http://www.emersonprocess.com/daniel/products/GC/Controllers/Productdetail.htm)).

## NOTICE

Updating the software requires a previously installed, registered copy of MON2000.

Use the *File>Update MON2000* menu to download the latest versions of MON2000 and the BOS software programs.

To download the latest versions of the software,



1. Use the computer on which MON2000 is installed and connect to the Internet. Minimize the Internet window.
2. From MON2000, select the *File>Update MON2000* menu. This opens the Emerson Chromatograph Controllers website ([www.emersonprocess.com/daniel/products/GC/Controllers/Productdetail.htm](http://www.emersonprocess.com/daniel/products/GC/Controllers/Productdetail.htm)).
3. From the Emerson Chromatograph Controller website, you can download the latest MON2000 and BOS updates, view and/or download catalogs, brochures, equipment specification sheets, product manuals, drawings, application notes, and white papers. Other links to products and services are also available.

## 2.9 CHECKLIST FOR SETTING UP MON2000

To ensure optimum performance,


- Configure your system security (see [Section 2.11.1](#)).  
Verify that you have assigned a password to the super user, and/or created a secure system Admin account.
- Configure how MON2000 will save your analytic and diagnostic information (see [Section 2.16.2](#)).
- Establish communications between MON2000 and the GC unit (see [Section 2.10](#) and [Section 5.17](#)).

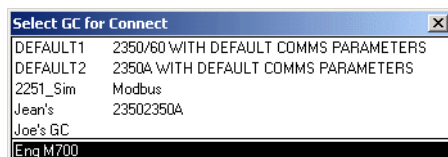
## 2.10 COMMUNICATIONS

MON2000 can communicate to the GC unit locally via a serial port cable, Ethernet connection, or remotely via a modem. If performing a remote connection, ensure that you have configured the PC modem first.

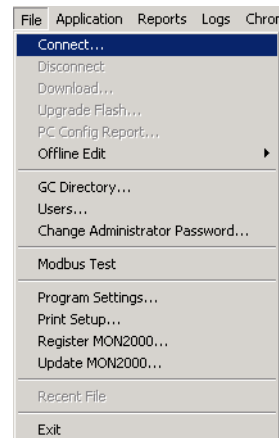
To configure the communication and serial port settings for the GC unit, see [Section 5.17](#).

### 2.10.1 Connect to the GC Unit

1. Use the *File > Connect* menu or click the toolbar  icon to access the Select GC for Connect menu.



2. Double-click the desired GC unit.



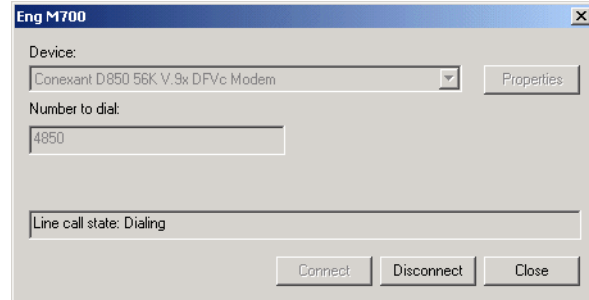


**NOTICE**

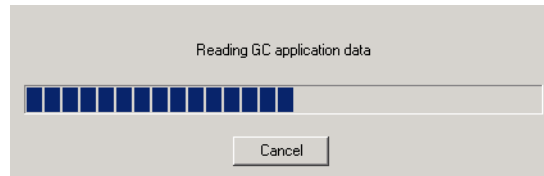
If another user is already connected to the GC, the unit will “lock out” the second user.

When a PC connection is active, the GC Controller front panel will indicate a “System Lockout”. This status times out after 10 minutes.

- MON2000 appears the connection status dialog while dialing the selected unit.



The messages “Reading dictionary”, “Reading GC Application data” and “Logon” appears in the status bar and an information screen appears.

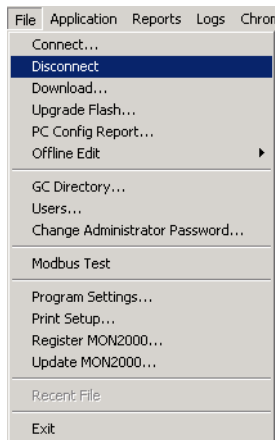



Once connected, the name of the GC unit displays in the lower left hand corner of the MON2000 main window.

**2.10.2 Disconnect from GC Unit**

Use this process to terminate an active PC connection to a GC unit.

The menu-driven procedure for disconnecting is completely optional. MON2000 intelligently and automatically disconnects when you exit MON2000 or connect to a second GC Controller.



- Use the *File > Disconnect* menu or click the toolbar  icon to access this function.
- MON2000 automatically terminates all open connections.

A Terminating communications message appears in the status bar.

If MON2000 does not detect an active connection to terminate, an “Invalid selection or not downloaded” message appears.

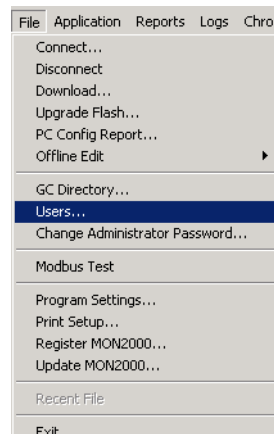
## 2.11 CUSTOMIZING MON2000

Use the following functions to customize users, the directory of GC applications, and PC communications parameters.

### 2.11.1 Configure Users


Use this function to create new user accounts or edit the existing account data. An extra level of security is assigned to the *File>Users* submenu. The *File>Users* submenu can only be accessed by first entering a Password into a dialog box titled 'Enter Administrator Password'. After gaining access to the Users dialog, the operator then has the ability to create new user accounts or edit existing account data. This feature is not available to the 'Regular' and 'Read Only' user.

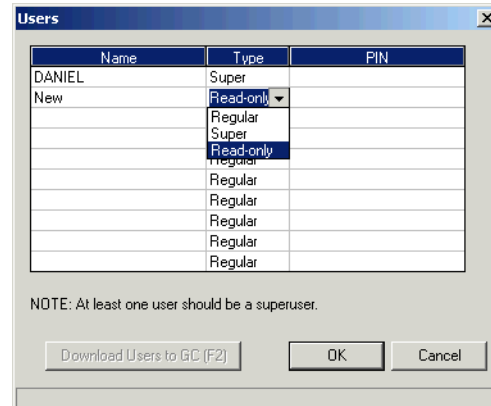
1. Use the *File > Users* menu to access this function.
2. The Enter Administrator Password dialog box appears.



Note that the default password **admin** is not case sensitive. This password is used as a security measure to deny unauthorized

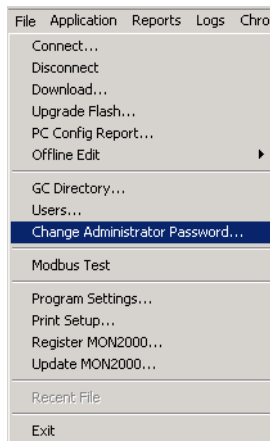
users access to the MON2000 Users submenu, which allows Super users to add, edit, or change security levels.

Click the  button. Then the Users dialog appears.




- Use the *File>Change Administrator* menu to change the Administrator password.

The Change Administrator Password dialog box appears.



Insert the old password, enter the new password and confirm the change.

Then, click the  button to apply your changes.

4. To configure a new user or edit existing user parameters,

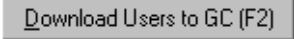
- (a) Click the appropriate *Name* cell and type the desired user name.


Note that the user name is not case-sensitive but punctuation (e.g., commas or spaces) is preserved.

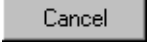
- (b) Click the appropriate *Type* cell and use the provided combo box to select the desired security level. Note that there should be at least one Super user.
- (c) Click the appropriate *PIN* cell and type the desired PIN for this user. Note that the PIN is limited to 12 numeric characters.

If no PIN is entered, the user can log on to the MON2000 software program or the GC unit (via the front panel) with the assigned user name – that is, no password will be required.

5. To write user data to the online GC unit,

- (a) Click the  or press the F2 key.
- (b) MON2000 writes the data to the GC Controller.

6. Click the  button to apply your changes and return to the main screen.

Click the  button to exit and return to the main screen without applying your changes.

## NOTICE

**Super users can write changes to the GC unit, configure MON2000, and access the Users function.**

**Regular and Read only users can only view data.**

**CAUTION**

Do not delete any currently used applications from the GC Directory. If an entry is inadvertently deleted, you may need to reinstall the application software for that GC.

**2.11.2 Set Up GC Directory**

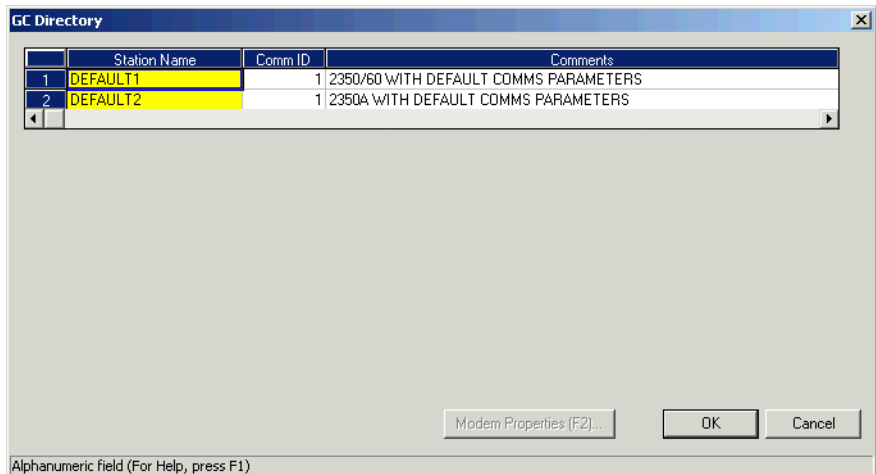
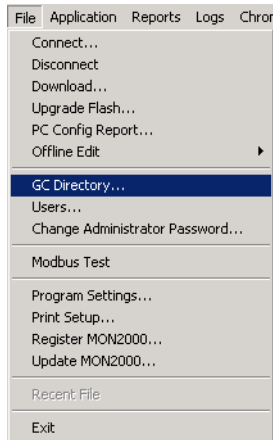
This function allows you to set up a directory listing of all GC units MON2000 can control for this application. From the GC Directory, you can configure the PC serial port communication parameters for a specific GC unit.

Data entered in the GC Directory is stored in the "Gcdir.dat" file (... \GC \BIN \). The Station Name is the user assigned name to a GC location. As GC applications are installed, MON2000 adds the application name to the GC Directory.

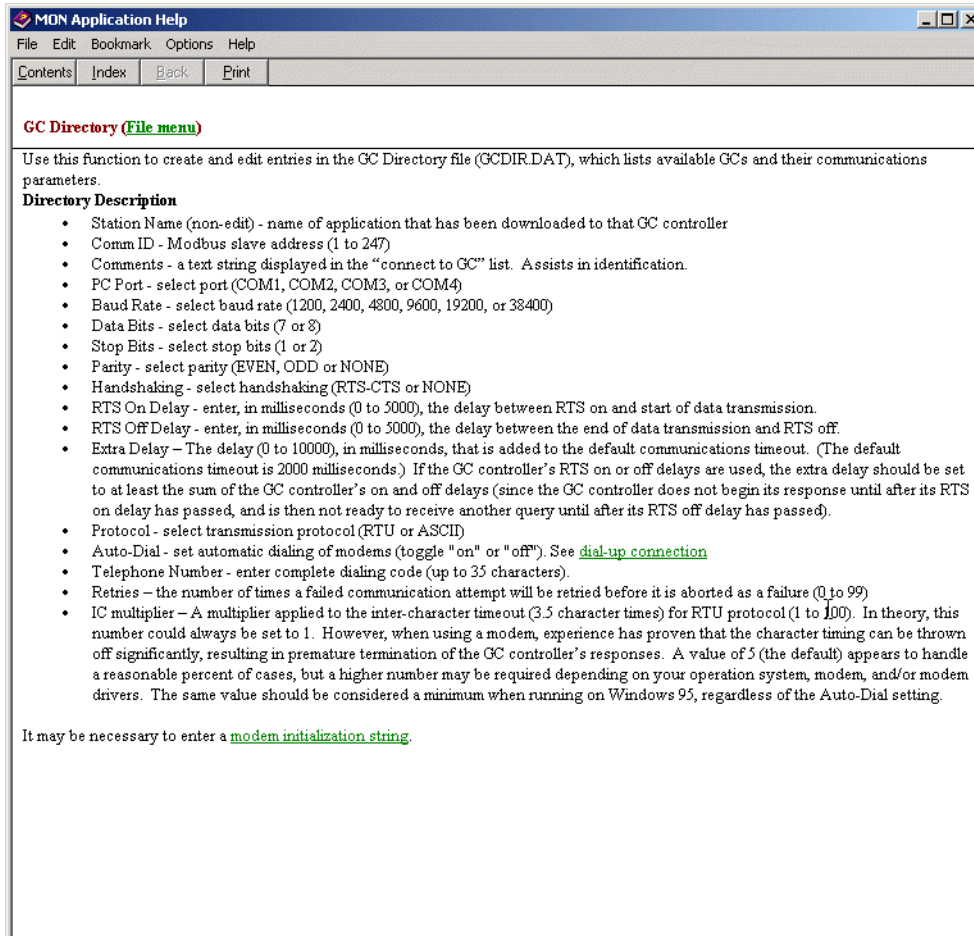
The GC unit name shown in the GC Status Bar of the MON2000 main window is entered via the System dialog (see Section 5.1).

To edit the GC directory,

1. Use the *File > GC Directory* menu to access this function.
2. The GC Directory dialog appears.



- Press the F1 key to open the MON2000 Application help file for detailed information about these settings.



- MON2000 is configured with two default directories:
  - Default 1: parameters are set for 9600 baud rate
- Default 2: parameters are set for 19200 baud rate.
- Click the appropriate *Com ID* cell and type the Modbus communication identification number (set by DIP switch positions on the

GC Controller system interface board) for the GC unit.

To successfully connect to the GC unit, the COM IDs specified via the *File>GC Directory* and the *Application>Serial Ports* dialogs must match. See [Section 5.17.1](#) for more information.

7. Click the *Comments* cell to enter any helpful information regarding a particular GC unit, such as location or purpose.
8. Use the dynamic pull-down menus to select the desired *PC Port*, *Baud Rate*, *Data Bits*, *Stop Bits*, *Parity*, and *Handshaking* settings.

## NOTICE

The following parameters support an auto-detect setting: **Baud Rate**, **Data Bits**, **Stop Bits**, **Parity**, **Protocol**.

Set any of these parameters to "?" (autodetect) and **MON2000** will conform to the settings used by the GC unit.

9. Use the provided cells to input *RTS On Delay*, *RTS Off Delay*, and *Extra Delay* values.

The *Extra Delay* field accepts numerical values (0 to 9000 milliseconds) for additional time to be added to the current communication timeout delay.

10. Use the *Protocol* pull-down menu to select the desired Modbus communications protocol.
11. If you plan to connect remotely to the GC unit via a modem or Ethernet connection, use the *Connection Type (Direct/Remote)*

pull-down menu for a “Direct Connect” option or a previously configured modem.

### 2.11.3 Dial-up Connection

Use this command to run the Dial-up dialog to configure the GC Controller modem. The default properties from Windows® Control Panel are used so you must ensure that the modem connects at the GC Controller’s configured baud rate. It may be necessary to enter a [modem initialization string](#).

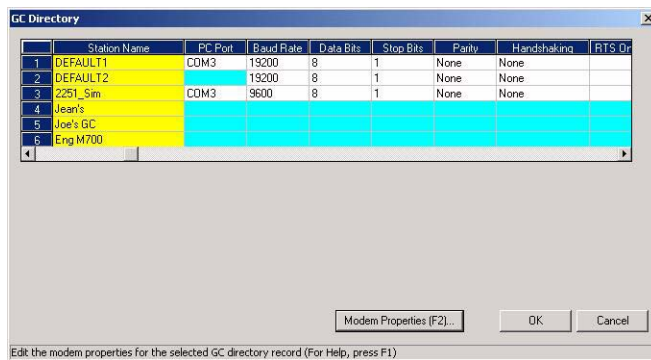
## NOTICE

The Direct Connect option allows you to connect from the PC to the GC Controller via a serial port, per its default settings.

If you select a modem, the modem property dialog appears, allowing you to change its attributes.

To configure the modem and make a connection,

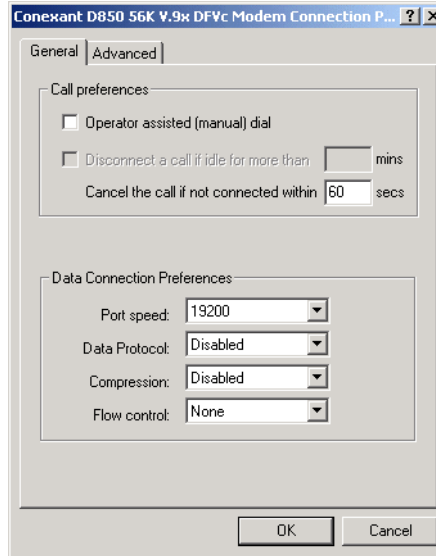
1. Use the *File>GC Directory* menu, and the GC Directory appears.



2. Click the **Station Name** data field and click the **Modem Properties** button or press the **F2** button.



3. The Modem Properties dialog appears and the **General Data Connection Modem Preferences** are activated.

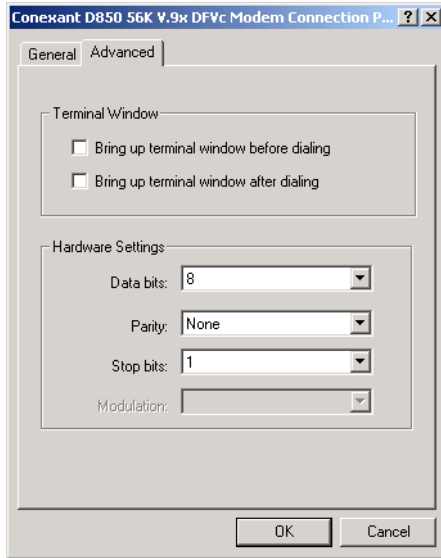


The General Data default settings are:

*Table 2-1 General Data Connection Preferences*

<b>Port Speed</b>	19200
<b>Data Protocol</b>	Disabled
<b>Compression</b>	Disabled
<b>Flow Control</b>	None



- Click the Advanced tab to configure the Hardware settings.



The Advanced Data default settings are:

*Table 2-2 Advanced Data Connection Preferences*

<b>Data Bits</b>	8
<b>Parity</b>	None
<b>Stop Bits</b>	1

- Click the  button to apply your changes, or click the  button to discard the changes and return to the GC Directory dialog.

6. Next, from the *GC Directory* dialog, scroll over to configure the following parameters:

## NOTICE

**The Baud Rate, Data Bits, and Stop Bits parameters were configured above.**


*Table 2-3 GC Directory Dialog Default Settings*

Heading	Pull-down Menu Selection
PC Port	COM1, COM2, COM3
Handshaking	None
RTS On Delay	0
RTS On Delay	0
Extra Delay	0 ( <b>See note</b> )
Connection Type (Direct/Remote)	Direct Connection Modem
Telephone	Complete number (Area Code) (XXX-XXXX)
Server Type - IP Address	XXX.XX.XX.XXX (10 digits)
Retries • Modem • IP Address	5 3
IC Multiplier	10

**NOTICE**

The Extra Delay is enabled for Ethernet connections.

The default value is "0" and the default 30 seconds timeout is used. If the value is changed to greater than "0", the value is used as the timeout. The entered value is multiplied by 10 inside MON2000, therefore the maximum timeout is 100,000 ms or 100 seconds (ex: If timeout value needs to be 15 seconds, the user should enter 1,500).

7. Click the  button to accept the changes. While connecting, MON2000 dials the number, attempts to connect via the selected modem and displays progress messages. A message box appears when a connection has been made or if the attempt to connect fails.

Once a connection has been established and while MON2000 remains connected via the modem, the **Connect** button is disabled and the **Disconnect** button is enabled.

If the connection fails at any time, MON2000 displays a message in the GC Status bar that it has been disconnected. You can end the connection from the *File>Disconnect* menu, by clicking the disconnect icon on the MON2000 toolbar, or by exiting MON2000.

## NOTICE


**If you are using the Modbus RTU protocol, the values for baud rate, data bits, stop bits, and parity must match the settings you configured in the Modem Properties dialog.**

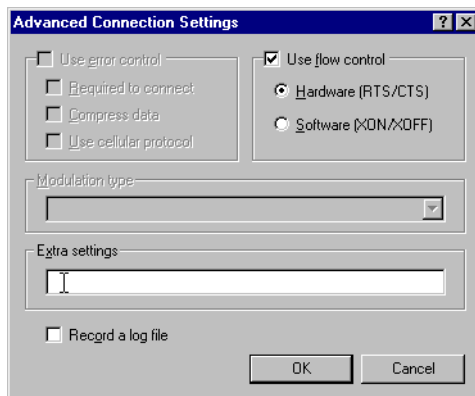
**These values are required to correctly calculate character timing.**

When you start MON2000 after the parameters are established, you can connect to the GC via the *File>Connect* menu or by clicking the **Connection** icon on the MON2000 toolbar.

#### 2.11.4 Modem Initialization Strings/Setup

This section provides “examples” of modem initialization strings and setups that have been tested and proven operable. This string of text characters, known as 'AT commands', has special meaning to the PC modem and is used by the modem for every telephone connection made to a selected GC unit.

To edit or enter a modem initialization string, use the  button and use the *Control Panel > Modems > General > Properties > Connection > Advanced* to access the Advanced Modem Connection Settings dialog. Enter the modem initialization string in the Extra Settings field.



By default, MON2000 provides a modem initialization string that serves the purpose for most Hayes-compatible modems. Therefore, in most cases, you need not enter a different string.

However, for some modems, you may want to consult the following pages which document initialization strings and modem setups that have been field-tested.

## NOTICE

The default initialization string that MON2000 provides is sent to the PC modem first. Then the custom initialization string you provide is sent. In this manner, MON2000 sets the modem parameters that it requires, while you can customize the modem's operation to respond to special conditions.

Once the optimum modem initialization string has been determined, it should need no further revision unless a different brand or model of modem is installed.

### Black Box - Modem 325

During development of the GC Controller, a Black Box Modem 325 was used to test modem communications with the GC unit. For that test and that modem, the modem initialization was set as follows:

`\N0\C0\Q0` (where 0 = zero)

Interpretation of the AT commands for that particular modem was as follows:

- \N0 = normal mode; no error control; data is buffered (versus 'direct mode,' 'reliable mode,' or 'auto reliable mode')
- \C0 = disable auto reliable buffer (versus 'buffer data for 4 seconds or 200 characters')
- \Q0 = disable flow control (versus 'enable XON/XOFF flow control,' 'enable unilateral CTS flow control,' or 'enable bilateral CTS/RTS flow control')

#### **U.S. Robotics Sportster**

The following setup for U.S. Robotics Sportster 28.8 Kbps external FAX-modems was verified at the GC assembly and checkout lab:

- At the GC Controller, the modem DIP switches were set to 5 and 8 UP, the rest DOWN.
- At the PC, the modem DIP switches were set to 2, 4, 6, and 7 UP, the rest DOWN.



With these switch settings, initialization string &F was required. See Table 2-4 for further explanation of these switch settings and the parameters they control.

Table 2-4 DIP Switch Settings for U.S. Robotics Sportster Modem

Switch	Function	At GC	At PC
1	UP (off) – Normal DTR; computer must provide DTR signal for modem to accept commands.		
	DOWN (on) – Modem ignores DTR.	✓	✓
2	UP (off) – Verbal (word) results.		✓
	DOWN (on) – Numeric results.	✓	
3	UP (off) – Suppress result codes.		
	DOWN (on) – Enable result codes.	✓	✓
4	UP (off) – Display keyboard commands.		✓
	DOWN (on) – Suppress echo.	✓	
5	UP (off) – Modem answers on first ring or higher.	✓	
	DOWN (on) – Disable auto answer.		✓
6	UP (off) – Modem sends carrier detect (CD) signal on connect, and drops CD on disconnect.		✓
	DOWN (on) – CD always on.	✓	
7	UP (off) – For power-on and ATZ reset, the Y or Y1 configuration is used from user-defined nonvolatile memory (NVRAM).		✓
	DOWN (on) – For power-on and ATZ reset, the generic template, &F0, is used from read only memory (ROM).	✓	
8	UP (off) – Disable AT command set recognition.	✓	
	DOWN (on) – Enable AT command set recognition.		✓

### GVC/MaxTech 28.8 Kbps Modem

The following setup for GVC 28.8 Kbps external Voice/Data/FAX modems was verified at Daniel Canada. At the GC Controller:

## NOTICE

To make these settings for the modem at the GC Controller, you will need to use a terminal program (such as ProComm or other commercial modem software) to input the "AT" commands to the modem before connecting it to the GC Controller.

AT&F5      Factory default with v.42bis flow control disabled (must be first).

ATB8      9600 baud

Or

ATB11     19200 baud

AT&D0     Modem ignores DTR (not necessary if using a cable that incorporates the DTR signal from the Controller).

ATM0      Turn OFF speaker.

ATS0=n    n is number of rings for auto answer (e.g., ATS0=1, ATS0=2, etc.).

AT&C0     Force carrier detect high

AT%C0    Turn OFF compression.

## NOTICE

**If compression is turned ON with AT%C1, or OFF with AT%C0, then the modem at other end should match.**

AT&W0     Write to stored profile "0" (zero).

AT&Y0     Use stored profile "0" (zero) when turned on.

At the PC, use &F5%C1M0 which indicates a factory default with v.42bis flow control disabled / compression ON / speaker OFF.

## **2.12 2350 TO 2350A RETROFIT INSTRUCTIONS**

The 2350A GC Controller CPU assembly has been designed to include all digital I/O and COM3 and COM4 serial ports. This eliminates the requirement (and additional cost) for an I/O assembly or DSPI/O assembly.

In addition, BOS is now resident in the DiskOnChip, instead of an EPROM set. The DiskOnChip provides additional expanded memory for archiving data, instead of having to purchase a memory expansion board assembly. The BOS file in the DiskOnChip may be upgraded in the field through MON2000.

Optional boards may be plugged directly into the PC/104 Bus (connectors J19 and J20) on the CPU board assembly. The COM4A board provides four additional serial ports (COM5 through COM8). A modem board and/or Ethernet board may be also be plugged directly into the PC/104 Bus for additional communications requirements.

The PC/104 Bus is designed to allow any combination of option boards to be installed in any order, with the exception of the CSA approved Radicom modem board which must be the top board in the assembly. (see [Figure 2-1](#)).



*Figure 2-1 2350A Controller Card Cage Assembly*

## NOTICE

**If you are using the CSA approved Radicom modem; ensure that it is the top card in the card cage assembly. The connection configuration of the Radicom modem requires installation at the top of the assembly.**

## 2.13 CONVERSION PROCESS

Use the following process to retrofit a 2350 GC Controller to a 2350A GC Controller.

1. At the GC Controller site, remove the Controller enclosure's front panel.



### **SERIOUS PERSONAL INJURY OR DEATH POSSIBLE**

**Before removing the unit cover from the GC Controller, make certain the power supply switch is OFF and the AC power cord is disconnected. Observe all safety precautions when you are working in a hazardous environment.**

Failure to observe all safety precautions could result in serious injury or death.

- (a) For the explosion-proof Controller, the front panel is secured by 16 screws. Remove those screws first.
  - (b) Then carefully lower the front panel on its bottom hinges. The front panel is heavy, so make sure it does not drop and cause damage.
  - (c) For the rack mount Controller, the rear of the enclosure is open; it allows access for most field wiring procedures without removing the enclosure.
2. Locate the GC Controller's Terminal Board for Field Wiring (TB). The TB is attached to the GC Controller's card cage assembly, facing the enclosure's front panel. (In the rack mount Controller, the TB faces outward toward the rear of the enclosure.)
  3. Loosen the six screws that secure the TB. Then unplug the TB from its connections at the back, top of the board.

4. Lower the TB down and out of the way, held in place by its ground straps at the bottom of the board. This exposes the Card Cage Assembly.
5. Loosen the four screws that secure the Card Cage Assembly to the chassis. Then remove the Card Cage Assembly away from its chassis mount so that it is easy to work on.
6. Locate the System Interface and Driver board. It is mounted to the top of the Card Cage Assembly.
7. Remove all cables connected to the System Interface Board (P/N 3-2350-005, P/N 3-2350-022, or P/N 3-2350-023).
8. Remove the I/O48 Board assembly (drawing P/N BE-12973) and cables from the top slot of the Cage Card Assembly. This board is not used on the 2350A GC Controller.
9. Remove the CPU Board assembly (P/N CE-19281) and cables from the second slot of the card cage assembly. This board is not used on the 2350A GC Controller.

10. Remove the DSPI/O board assembly (drawing P/N CE-12976) and cables from the third slot of the card cage assembly. This board is not used on the 2350A GC Controller.
11. Remove any other optional boards, such as memory expansion boards and associated cables. These parts are not used on the 2350A GC Controller.
12. Leave the Analog Board assembly (drawing P/N BE-18044) with attached cable in the card cage. This board is used on the 2350A basic configuration.
13. Change the fuse in the in-line fuse holder from 1 amp to the 2.5 amp, Slo-Blo fuse provided. The fuse is located in the cable (P/N 2-3-2350-069) between the power supply and the System Interface Board.
14. Ensure that DIP Switches 6, 7, and 8 of S1 are all in the "OFF" position. If the 2350A is powered up with S8 in the OFF position, it will delete the current application (commonly called a "Cold Start").
15. To inspect or change the GC Controller's COM ID setup at the GC Controller site, locate the DIP switch as described in the following steps.

**SERIOUS PERSONAL INJURY OR DEATH POSSIBLE**

**Before removing the unit cover from the GC Controller, make certain the power supply switch is OFF and the AC power cord is disconnected. Observe all safety precautions when you are working in a hazardous environment.**

Failure to observe all safety precautions could result in serious injury or death.

16. For the explosion-proof Controller, the front panel is secured by 16 screws. Remove those screws first.

- (a) Then carefully lower the front panel on its bottom hinges. The front panel is heavy, so make sure it does not drop and cause damage. The DIP switch is located on the lower left side of the front panel (see Figure G-2).



*Figure 2-2 Explosion-Proof Controller Dip Switch*



17. For rack mount and panel mount Controllers, use a flat head screw driver to remove the access panel on the right side of the card cage assembly (see [Figure 2-3](#)).



*Figure 2-3 Right Side View Rack and Panel Mount Units*

18. Inspect or change the DIP switch settings as necessary.
  - (a) See [Table 2-5](#) as a guide.
  - (b) Make sure you record in the GC Controller's maintenance records any changes you make to the switch settings.
    - Switches "1" through "5" form a 5-bit binary number for setting the Modbus slave address (also known as COM ID or Device ID.)
    - Switch number "1" is the least significant bit, and switch number "5" is the most significant bit.

Switch to ON = 1

Switch to OFF = 0

- Switch "6" is a spare for future use. Switches "7" and "8" are set as needed for the presence of an optional LOI (Local Operator Interface) connected via COM8. When the COM4A Board is installed, the LOI is connected via COM4. If the COM4A Board is not installed, the LOI is connected via COM4.

*Table 2-5 Dip Switch Settings Switch Positions*

COM ID	1	2	3	4	5
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF

**RAM CLEAR**

**Dip Switch Setting Positions**

	8
Clears RAM when unit is powered down	ON
Keeps RAM data when unit is powered down	OFF

## 2.14 BASIC 2350A CONFIGURATION

At this point, install, if any, all mounting hardware and optional PC/104 boards onto the 2350A CPU Board.

1. Install the 2350A CPU (P/N 3-2350-090) into slot 3 of the card cage assembly.
2. Install cables on the CPU Board in the following sequence:
  - (a) Digital I/O cable (P/N 3-2350-081) from CPU J7 to the System Interface Board J2.
  - (b) Digital I/O cable (P/N 3-2350-080) from CPU J4 to the System Interface Board J3.
  - (c) COM1, COM2, and the printer cable (P/N 3-2350-083) from CPU J1 to the System Interface Board J4, J9, and J11.
  - (d) COM3 and COM4 can be configured two different ways. To configure a system WITHOUT a keyboard and display, connect cable (P/N 3-2350-084) from CPU J6 to the System Interface Board J8 and J10. This provides access to COM3 on J10 and COM4 on J11 of the Field Termination board. The serial port setup in the MON2000 Software for COM4 must be selected as a PC port.
  - (e) For a system WITH a keyboard and display, connect cable (P/N 3-2350-087) from CPU J6 to the System Interface J8 and J12. This provides access to COM3 on J10 and COM4 is dedicated for use as a serial interface to the keyboard and display. COM4 will not be available at J11 of the Field Termination board.

The serial port setup in the MON2000 Software for COM4 must be selected as Front Panel (see Figure 2-4). If all four serial ports are required for communications on a system with keyboard and display, an optional COM4A Board must be installed and a COM7 and COM8 cable (P/N 3-2350-086) connected (see Figure 2-5). The serial port setup in the MON2000 Software for COM8 must be configured as Front Panel. See Figure G-4b.

- (f) Reinstall the Analog cable to J6 on the System Interface Board.
- (g) Place the "Unit Updated to 2350A" label, included with the upgrade kit, on the instruction decal located on the inside, right wall of the explosion-proof units or on the card cage of the rack or panel mount units.

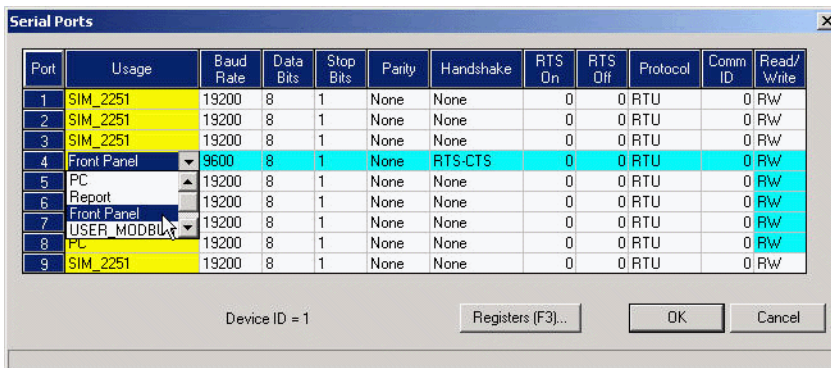


Figure 2-4 Serial Port 4 with COM4A Board

Port	Usage	Baud Rate	Data Bits	Stop Bits	Parity	Handshake	RTS On	RTS Off	Protocol	Comm ID	Read/Write
1	SIM_2251	19200	8	1	None	None	0	0	RTU	0	RW
2	SIM_2251	19200	8	1	None	None	0	0	RTU	0	RW
3	SIM_2251	19200	8	1	None	None	0	0	RTU	0	RW
4	SIM_2251	19200	8	1	None	None	0	0	RTU	0	RW
5	PC	19200	8	1	None	None	0	0	RTU	0	RW
6	PC	19200	8	1	None	None	0	0	RTU	0	RW
7	PC	19200	8	1	None	None	0	0	RTU	0	RW
8	Front Panel	9600	8	1	None	RTS-CTS	0	0	RTU	0	RW
9	PC	19200	8	1	None	None	0	0	RTU	0	RW

Device ID = 1

Buttons: Registers (F3)... OK Cancel

Figure 2-5 Serial Port 8 with COM4A Board

## 2.15 2350A OPTIONS

The following board configurations are optional for the Model 500 GC with 2350A Controller.

### 2.15.1 The COM4A Board

1. To add four additional communications ports at the GC Controller site, remove the Controller enclosure's front panel.



#### **SERIOUS PERSONAL INJURY OR DEATH POSSIBLE**

**Before removing the unit cover from the GC Controller, make certain the power supply switch is OFF and the AC power cord is disconnected. Observe all safety precautions when you are working in a hazardous environment.**

Failure to observe all safety precautions could result in serious injury or death.

- (a) For the explosion-proof Controller, the front panel is secured by 16 screws. Remove those screws first.
  - (b) Then carefully lower the front panel on its bottom hinges. The front panel is heavy, so make sure it does not drop and cause damage.
  - (c) For the rack mount Controller, the rear of the enclosure is open; it allows access for most field wiring procedures without removing the enclosure.
2. Locate the GC Controller's Terminal Board for Field Wiring (TB). The TB is attached to the GC Controller's Card Cage Assembly, facing the enclosure's front panel. (In the rack mount Controller, the TB faces outward toward the rear of the enclosure.)
  3. Loosen the six screws that secure the TB. Then unplug the TB from its connections at the back, top of the board.

4. Lower the TB down and out of the way, held in place by its ground straps at the bottom of the board. This exposes the Card Cage Assembly.
5. Loosen the four screws that secure the Card Cage Assembly to the chassis. Then remove the Card Cage Assembly away from its chassis mount so that it is easy to work on.
6. Locate the System Interface and Driver board. It is mounted to the top of the Card Cage Assembly.
  - (a) Disconnect the Analog cable from J6 on the System Interface Board, then disconnect all CPU cables from the System Interface Board.
  - (b) Remove the CPU assembly and install the COM4A Board, with associated mounting hardware to J19 and J20 PC/104 Bus connector on the CPU assembly.
  - (c) Connect COM5 (P22) and COM6 (P23) on the Field Termination board via cable (P/N 3-2350-085) to J6 on COM4A.
  - (d) Connect COM7 (P24) on the Field Termination board and COM8 via cable (P/N 3-2350-086) to J3 on COM4A.
  - (e) Install the CPU assembly into the third slot of card cage. Connect the CPU cables as detailed in Section 6.3 Basic 2350A Configuration.
  - (f) Install the DB9 connector from COM5 to P22 on the Field Termination board with jackpost assemblies.
  - (g) Install the DB9 connector from COM6 to P23 on the Field Termination board with jackpost assemblies.
  - (h) Install the DB9 connector from COM7 to P24 on the Field Termination board with jackpost assemblies.

- (i) Install the ten position connector from COM8 to J12 on the System Interface Board.
- (j) Connect the Analog cable to J6 on the System Interface Board.

With COM4A Boards installed, Serial Port 8 is usually assigned via MON2000 Application>Serial Ports menu. Select Front Panel from the Usage pull-down menu (see Figure 2-6 and Figure 2-7).

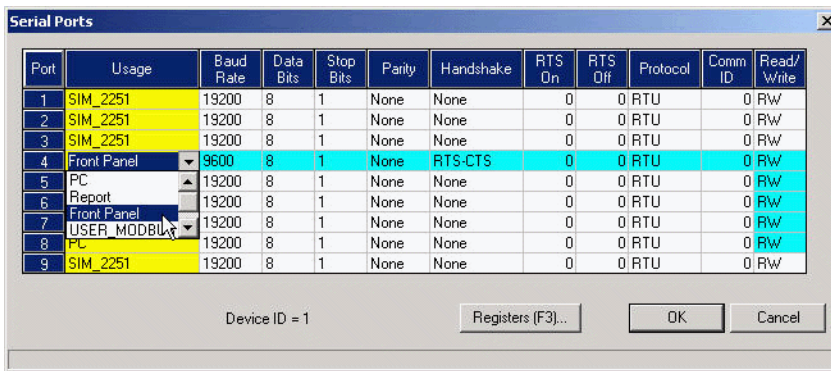


Figure 2-6 Serial Port 4 with COM4A Board

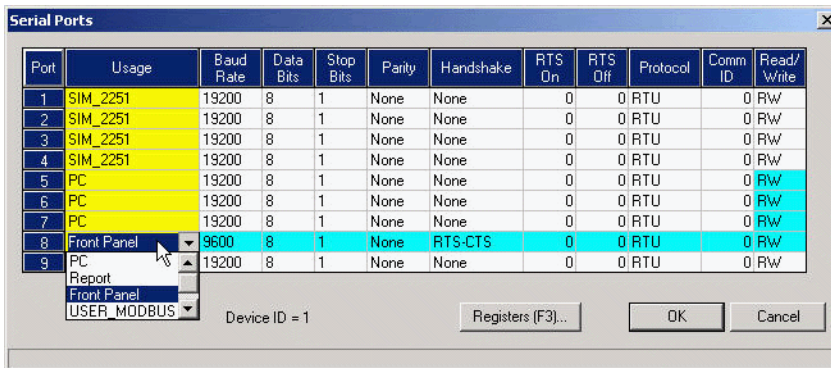


Figure 2-7 Serial Port 8 with COM4A Board



## 2.15.2 2350A Modem Installation

To install the Internal Modem for the 2350A GC Controller, follow these steps:

### NOTICE

Refer to P/N 3-9000-537 2350A GC Hardware manual for COM settings and pinouts.

1. To add a modem, at the GC Controller site, remove the Controller enclosure's front panel.
  - (a) For the explosion-proof Controller, the front panel is secured by 16 screws. Remove those screws first.
  - (b) Then carefully lower the front panel on its bottom hinges. The front panel is heavy, so make sure it does not drop and cause damage.
  - (c) For the rack mount Controller, the rear of the enclosure is open; it allows access for most field wiring procedures without removing the enclosure.
2. Locate the GC Controller's Terminal Board for Field Wiring (TB). The TB is attached to the GC Controller's Card Cage Assembly, facing the enclosure's front panel. (In the rack mount Controller, the TB faces outward toward the rear of the enclosure.)
3. Loosen the six screws that secure the TB. Then unplug the TB from its connections at the back, top of the board.
4. Lower the TB down and out of the way, held in place by its ground straps at the bottom of the board. This exposes the Card Cage Assembly.

5. Loosen the four screws that secure the Card Cage Assembly to the chassis. Then remove the Card Cage Assembly away from its chassis mount so that it is easy to work on.
6. Locate the System Interface and Driver board. It is mounted to the top of the Card Cage Assembly.
  - (a) Disconnect the Analog cable from J6 on the System Interface Board, then disconnect all CPU cables from the System Interface Board.
  - (b) Remove the CPU assembly and install the COM4A Board, with associated mounting hardware to J19 and J20 PC/104 Bus connector on the CPU assembly.

## NOTICE

If an option board is already plugged into the PC/104 bus on the CPU, the modem and mounting hardware will be installed into the PC/104 connector on the option board.



Figure 2-8 Modem Piggy-backed on CPU Board

- (c) Plug one end of the modem extension cable (P/N 3-2350-075) into J1 of the modem assembly. The in-line jack on the remaining end of the modem extension cable attaches to the lower left inside wall of the card cage shield (after the CPU assembly is reinstalled and all cables reconnected to the System Interface board). No software setup is required for this board.

7. To use an existing Modem (1414):

- (a) For operation with the 2350A CPU, set the Standard 1414 Modem jumpers per the following table:

*Table 2-6 1414 (Standard) Modem Jumper Settings*

<b>Jumper</b>	<b>Pin</b>
J4/J5	Open
J6	3-5, 4-6
J7	7-8
J9	Open

- (b) On the 2350A WinSystems CPU, set J21, pin 13-14.

### 2.15.3 2350A Ethernet Installation

To add an ethernet assembly:

1. To add an ethernet card at the GC Controller site, remove the Controller enclosure's front panel.
  - (a) For the explosion-proof Controller, the front panel is secured by 16 screws. Remove those screws first.
  - (b) Then carefully lower the front panel on its bottom hinges. The front panel is heavy, so make sure it does not drop and cause damage.
  - (c) For the rack mount Controller, the rear of the enclosure is open; it allows access for most field wiring procedures without removing the enclosure.
  - (d) Locate the GC Controller's Terminal Board for Field Wiring (TB). The TB is attached to the GC Controller's Card Cage Assembly, facing the enclosure's front panel. (In the rack mount Controller, the TB faces outward toward the rear of the enclosure.)
2. Loosen the six screws that secure the TB. Then unplug the TB from its connections at the back, top of the board.
3. Lower the TB down and out of the way, held in place by its ground straps at the bottom of the board. This exposes the Card Cage Assembly.
4. Loosen the four screws that secure the Card Cage Assembly to the chassis. Then remove the Card Cage Assembly away from its chassis mount so that it is easy to work on.

5. Locate the System Interface and Driver board. It is mounted to the top of the Card Cage Assembly.
  - (a) Disconnect the Analog cable from J6 on the System Interface Board, then disconnect all CPU cables from the System Interface Board.
  - (b) Remove the CPU assembly and install the COM4A Board, with associated mounting hardware to J19 and J20 PC/104 Bus connector on the CPU assembly.

### NOTICE

**If an option board is already plugged into the PC/104 bus on the CPU, the ethernet card and mounting hardware will be installed into the PC/104 connector on the option board.**

### NOTICE

**If you are using the CSA approved Radicom modem; ensure that it is the top card in the card cage assembly. The connection configuration of the Radicom modem requires installation at the top of the assembly.**

- (c) Plug one end of the Ethernet extension cable (P/N 3-2350-088) into J5 of the Ethernet assembly.
6. The in-line jack on the remaining end of the Ethernet extension cable attaches to the lower left inside wall of the card cage shield, after the CPU assembly is reinstalled and all cables reconnected to the System Interface board (see [Table 2-7](#) and [Table 2-8](#) below).

No software setup is required for this board.

*Table 2-7 System Interface Board Cable Connections*

Connection	Ribbon Cable
J5 and J6	Analog I/O
J8	Com3
J10	Com4
J4	Printer
J11	Com2
J2 and J3	Digital I/O
J12	Front Panel and Keyboard (if installed)

*Table 2-8 CPU Board Cable Connections*

Connection	Ribbon Cable
J1	Com1, Com2, and Printer
J4 and J7	Digital I/O
J6	Com3 and Com4

(a) If the 2350A BOS version is v1.84 or later, ensure that J6 Jumper on pins 13-14 of J1 has been removed.

(see [Figure 2-9](#) and [Figure 2-10](#)).

7. If a modem is installed, remove the phone cord.
8. Install the Ethernet card and set the jumpers as shown below.

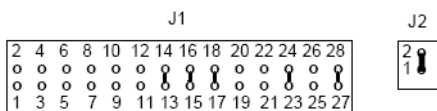


Figure 2-9 Ethernet Jumper Configuration BOS v1.82 and Earlier

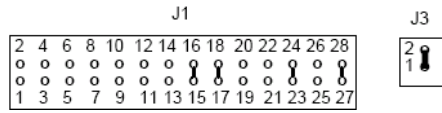


Figure 2-10 Ethernet Jumper Configuration BOS v1.84 and Later

## 2.15.4 Ethernet TCP/IP Settings

If you plan to connect via an Ethernet connection, use the following instructions.

To configure the Ethernet TCP/IP settings for the 2350A GC Controller:

1. Obtain the IP Address, Subnet Mask, and Gateway addresses (numbers) for the Target 2350A GC Controller from your supervisor or Information Technology Department.

### NOTICE

If the controller has never been configured for Ethernet communications, logon to the Model 500 GC using either the Direct Connect option, or connect remotely via a Modem.

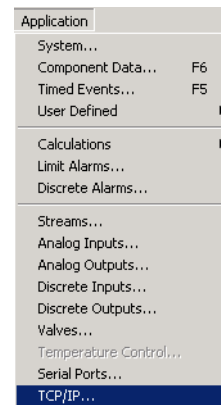
2. Use the *Application > TCP/IP* menu to access this function.
3. The TCP/IP dialog appears.

Usage	Comm ID	Host Name	Use DHCP/Specify an IP Address	IP Address	Subnet Mask	Gateway	Read/Write
PC	0	DANIELGC	Specify an IP Address	172.16.23.125	255.255.240.0	172.16.16.2	RW

Device ID = 1


OK Cancel

Selection field (For Help, press F1)



4. Go to the *Use DHCP/Specify an IP Address* field and select **Specify an IP Address**.
5. In the *IP Address* field, enter the IP Address (number) obtained from your Supervisor or the Information Technology Department.

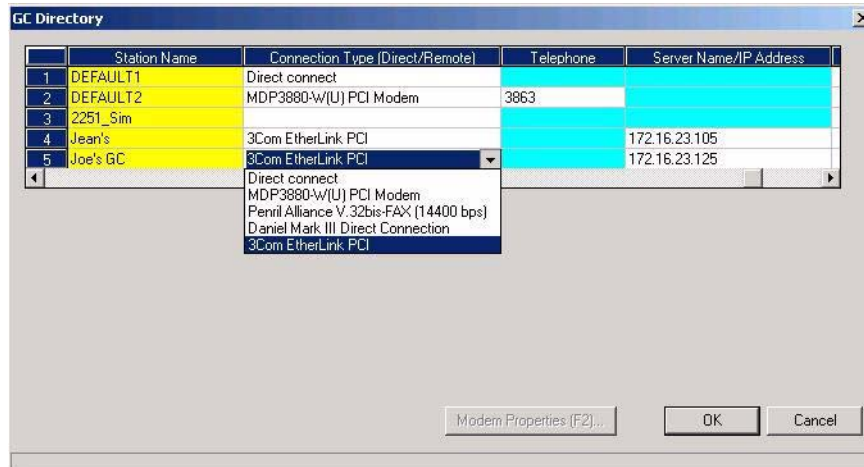
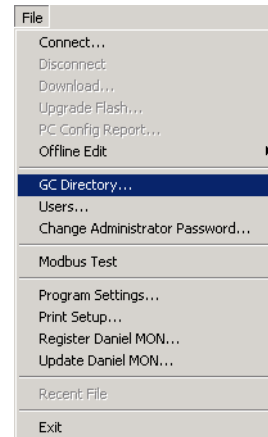


6. In the *Subnet Mask* field, enter the subnet mask address (number) obtained from your Supervisor or the Information Technology Department.
7. In the *Gateway Address* field, enter the Gateway Address (number) obtained from your Supervisor or the Information Technology Department.
8. Click the  button to apply all changes.
9. Disconnect from the controller, using the toolbar icon or by using the *File>Disconnect* menu.

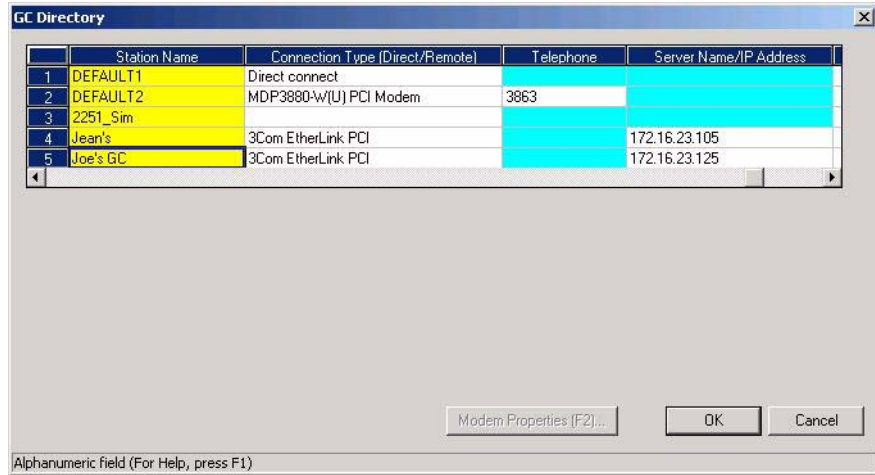
### 2.15.5 MON2000 TCP/IP Settings

To configure the Ethernet TCP/IP settings for the MON2000,

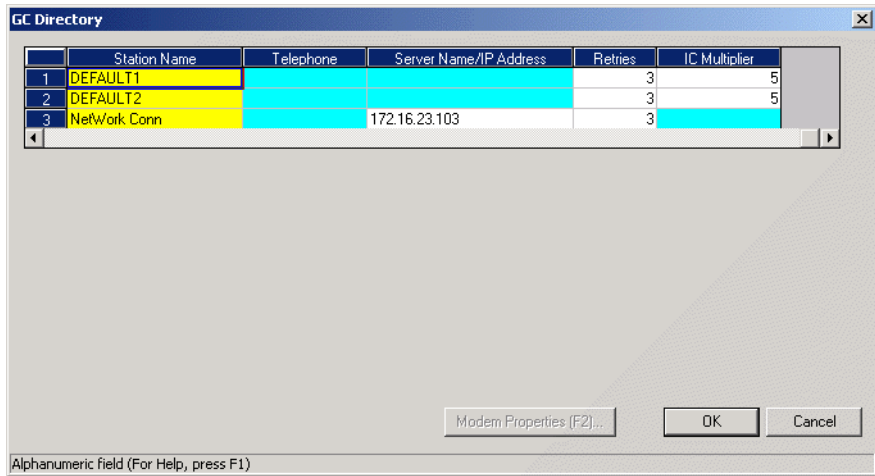
1. From the *File* menu, select GC Directory.
2. Ensure that an Ethernet location has been created or an existing location modified and that an Ethernet card installed in the PC has been selected in the field labeled Connection Type (Direct/Remote).




3. Enter the same 'IP Address' into the Server Name/IP Address field of the GC Directory that was previously entered in the GC Controller (see Section 2.11.2).



4. Set the number of retries to three.



Click the  button to apply your changes.

## 2.16 CONNECT VIA GC EXTERNAL MODEM

### NOTICE

Ensure you have a pre-existing PC connection to the GC unit before installing the external modem. If the GC unit is already on location, do this via another remote operator connection, or, onsite, via use of a portable PC and serial cable. Ideally, configure the GC unit and install the external modem prior to placement at the remote location.

**Note:** You cannot set the Serial Ports parameters from the GC unit front panel.)

### 2.16.1 HARDWARE SETUP

1. Halt any ongoing analysis runs.  
Use the *Control > Halt* menu to access this function.
2. Disconnect AC power from the GC Controller.



#### SERIOUS PERSONAL INJURY OR DEATH POSSIBLE

**Before removing the unit cover from the GC Controller, make certain the power supply switch is OFF and the AC power cord is disconnected. Observe all safety precautions when you are working in a hazardous environment.**

Failure to observe all safety precautions could result in serious injury or death.

3. For the explosion-proof Controller, remove the cover from the GC Controller housing to expose the GC Controller Terminal Board for field wiring.

For the rack mount Controller, the rear of the enclosure is open; it allows access for most field wiring procedures without removing the enclosure.

4. Connect a custom-made serial line cable (for RS-232 serial transmission) from the serial port of the external modem to an available serial port on the GC Controller Terminal Board for field wiring.

## NOTICE

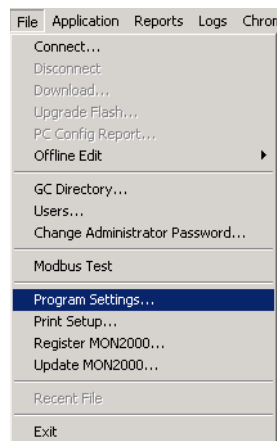
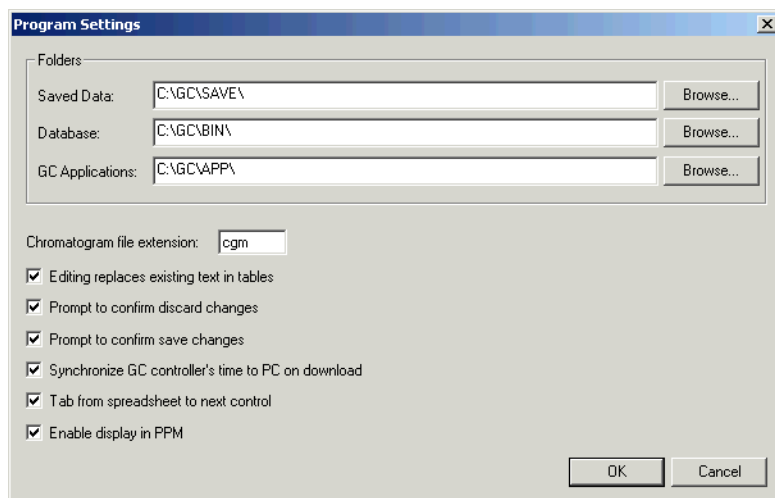
Special hardware modifications may be needed when operating an external GC modem from the GC serial ports 3 or 4 (COM3 or COM4), as follows:

- DE-20782 (see drawing addendum of *Model 500 Gas Chromatograph System Hardware Reference Manual*, P/N 3-9000-537).
  - Transient protection modules M7 and/or M4, located on the back side of the GC Controller Terminal Board for field wiring, may need replacement with the transient protection modules for RS-232 signals (P/N 3-2350-027). Note that M4 serves COM3 and M7 serves COM4.
    - Make note of the serial port number you choose for connection. You will need this information later to make appropriate software settings.
    - Use an RS-232 serial cable no longer than 50 feet. Longer distances may result in spurious loss or corruption of transmitted data.
    - See [Section 5.17](#), for details of GC Controller serial port connectivity (i.e., port locations, pinouts, connector types, gender, cabling, etc.).
5. Connect a telephone line (from wall phone jack, if available) to the phone jack for the external modem.
  6. Set external modem for Auto Answer (see external modem user manual).

## 2.16.2 Select Program Settings

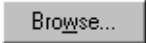
This function allows you to configure where database, GC applications, and Modbus Test program files are stored.

1. Use the *File > Program Settings* menu to access this function.
2. The Program Settings dialog appears.



3. To use a Chromatogram file extension other than the default (e.g. .CGM) or to select the location of saved data, GC database, and GC application files,
  - click in the Chromatogram file extension data field and type the desired file extension
  - click in the appropriate data field and type the desired directory,


Or

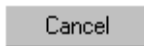
- click the  button and use the directory tree to select the desired location

4. Use the provided check boxes to turn the following settings on/off. Note that the default settings are ON.

*Table 2-9 Optional Program Settings*

<b>Setting</b>	<b>Function</b>
Editing replaces existing text in tables	If enabled, replaces selected table cell entry with user input. If disabled, appends user input to end of the selected table cell entry.
Prompt to confirm discard changes	Display confirmation dialog before exiting a dialog that contains changed data.
Prompt to confirm save changes	Display confirmation dialog before saving changed data.
Synchronize GC Controller's time to PC on download, etc.	Program the GC Controller clock to match the PC clock upon download.
Tab from spreadsheet to next control	Move from field to field and button to button (rather than from cell to cell within a spreadsheet or tabular display).
Enable display in PPM	If enabled, percentages less than 0.99% are displayed in PPM (parts per million) rather than as a percentage.

5. Click the  button to apply your changes and return to the main screen.

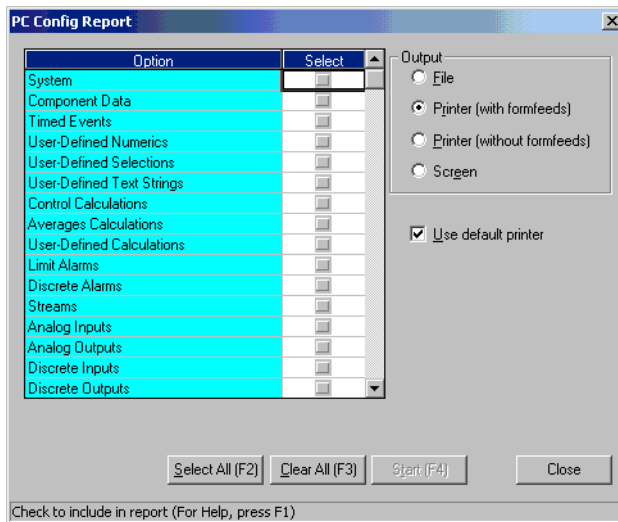
Click the  button to exit and return to the main screen without applying your changes.

### 2.16.3 Generate PC Config Report

This function allows you to generate or print out a report of the currently active GC application control settings. See [Appendix A](#) for a sample print-out of a PC Config Report.

To view a PC Config Report already saved to disk, see [Section 7.1.2](#).

1. Use the *File > PC Config Report* menu to access this function. The PC Config Report dialog appears.
2. Click the check boxes (see *Select* column) to choose the data you want included in the configuration report.

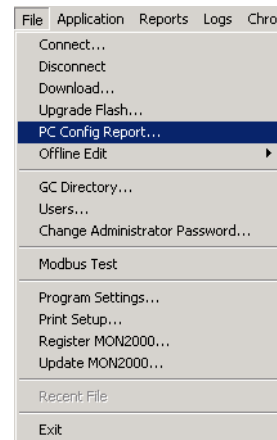


Click the **Select All (F2)** button or press the F2 key to select all options.

Click the **Clear All (F3)** button or press F3 to deselect (i.e., clear) all checked options.

## NOTICE

**Output data for the PC Config Report depends on the GC Controller and its application.**





**NOTICE**

If you want to use the standard Windows® Print dialog to select a printer, deselect the *Use default printer* option.


3. Use the *Output* radio buttons to either save the report to disk, print the report with or without form feeds, or display the report via the report viewer (see Section 7.1).

The *File* option will open the Save As dialog, with CONFIG.TXT as the default file name.

The *Printer (with form feeds)* option will print the report, with form feeds, to your configured printer (see Section 3.7).

The *Printer (without form feeds)* option will print the report, without form feeds, to your configured printer (see Section 3.7).

The *Screen* option will launch the report viewer (see Section 7.1).

4. Click  the button or press the F4 key to generate your customized PC Config Report.

**NOTICE**

If you are online with the GC Controller, a PC Config Report that includes all options can require up to 20 minutes to generate and save. Printing a full report can take longer.

If you press the ESC key, MON2000 will stop after the current option is completed.

A progress bar appears, indicating the completion status.

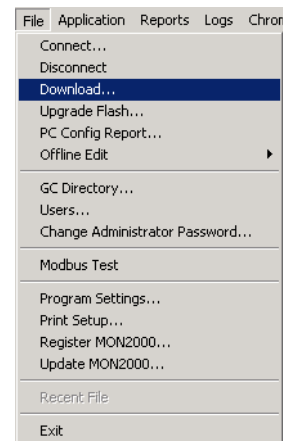
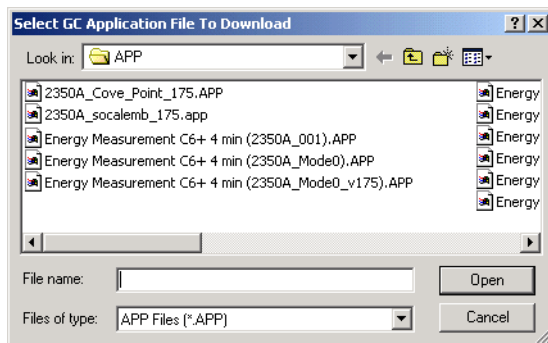
## 2.17 DOWNLOADING AN APPLICATION

This function allows the MON2000 operator to download applications to GC Controllers. GC applications with the .APP extension can only be downloaded to 2350A GC Controllers and Model 700 units. The Download feature is NOT available if the keylock switch is closed.

At the end of the download process, MON2000 displays the Set GC Time dialog, which allows you to accept or change the GC Controller's date and time.

Only download an application when performing an initial startup, downloading a new GC application, or after the GC unit has been out of service. You must first connect to the GC to use the Download function.

1. Use the *File > Download* menu to access the Select GC Application File To Download dialog.

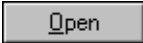


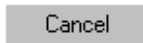
2. Click the desired .app file. The file name appears in the *File name* data field.

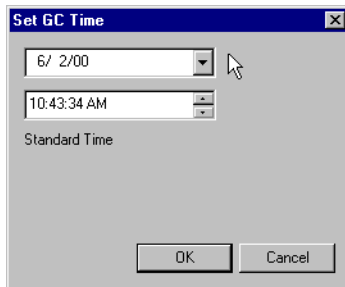
## NOTICE

GC application files contain all control settings and application program functions (see Section 5) specific to a particular GC Controller.

For 2350A GC Controllers and the Model 700 controller, application files (.app files) are normally stored in the \GC\APP directory.

3. Click the  button to download the selected application file to the connected GC unit.

Click the  button to exit and return to the main window.



4. MON2000 reads the time at the GC Controller and the Set Time dialog appears for you to edit or accept (see Section 4.7.2 for more information).
5. A progress bar appears, indicating the completion status. See Table 2-10 for a listing of the automatically enabled function keys.

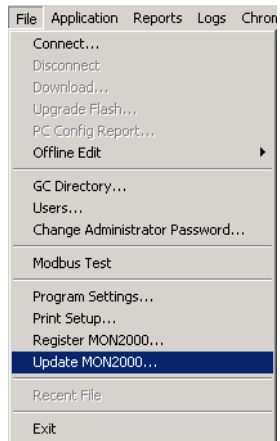
*Table 2-10 Main Menu Function Keys Enabled by Download*

<b>Key</b>	<b>Function</b>	<b>Description</b>
F1	Help	Access context-sensitive online help.
F2	Start Auto Sequence	Initialize the Auto-Sequencing function. This function is also available via the <i>Control &gt; Auto Sequence</i> menu.
F3	Halt	Stop a function at the end of the current cycle. This function is also available via the <i>Control &gt; Halt</i> menu.
F5	Edit TEVs	Display the Timed Event Tables. This function is also available via the <i>Application &gt; Timed Events</i> menu.
F6	Edit CDTs	Display the Component Data Tables. This function is also available via the <i>Application &gt; Component Data</i> menu.
F7	View Current CGM	Display chromatogram of the stream currently being analyzed. This function is also available via the <i>Chromatogram</i> menu.
F8	View Last CGM	Display chromatogram stored in the GC unit. This function is also available via the <i>Chromatogram</i> menu.

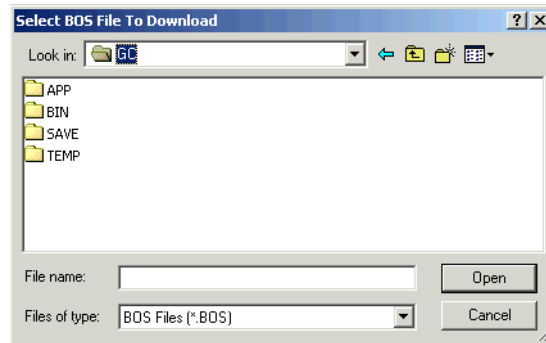
## 2.18 UPGRADING FLASH

Use this function to download a BOS file to a connected GC Controller.

Only download a BOS file when upgrading the GC firmware or after the GC unit has been out of service. You must first connect to the GC to use the Upgrade Flash function.



1. Use the *File > Upgrade Flash* menu to access the Select BOS File To Download dialog.



2. Click the desired BOS file. The file name appears in the *File name* data field.
3. Click the  button to download the selected BOS file to the connected GC unit.

Click the  button to exit and return to the main window.

## 2.19 OFFLINE EDIT OF GC APPLICATION

Use this function to edit a GC application file that is saved on disk or has been downloaded (and is currently on, or being used by, the GC unit).

When selecting Offline Edit, you can choose either:

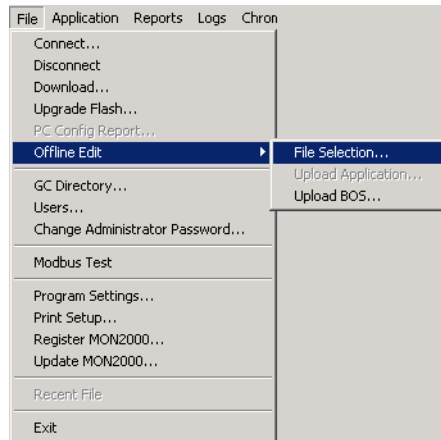
- File Selection – Allows you to edit a GC application file stored on disk.
- Upload Application – Allows you to upload the current GC application data from the GC Controller and save to file for future editing.
- Upload BOS - Allows you to upload the current BOS (i.e., firmware) file from the GC Controller to save for future download.

See the following sections for detailed instructions.

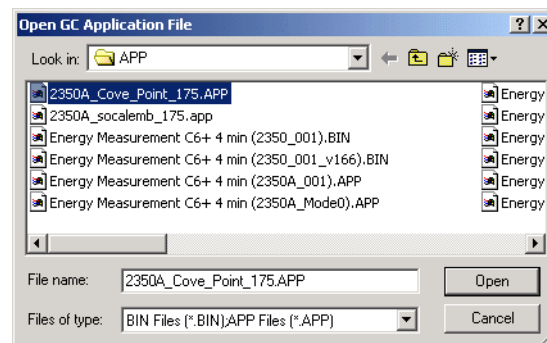
### 2.19.1 File Selection

This function allows you to edit a GC application file stored on disk.

1. Use the *File > Offline Edit > File Selection* menu to access this function.



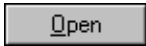
The Open GC Application File dialog appears.



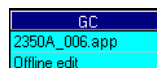
## NOTICE

The GC application files (.APP) are normally stored in the \GC\App directory.

Using the directory tree, select the desired application file.

2. Click the  button.
3. Edit this file by using the MON2000 Application functions (see [Section 5](#) for more information).

Note that the application file name is displayed in the GC status dialog and the File Edit mode (i.e., Offline Edit) is displayed in main screen titlebar.



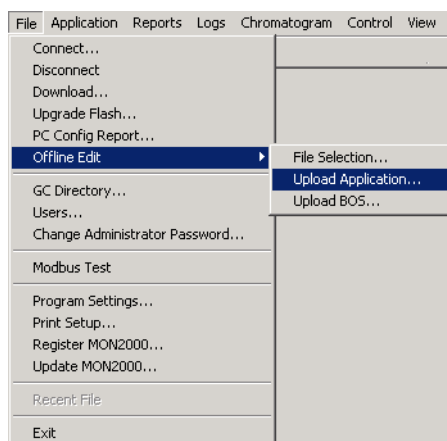
When you have finished editing this file, you can download it to the GC Controller (see Section 2.17) or save for future use.

### 2.19.2 Upload Application

This function allows you to upload the application from an online GC Controller to a disk file and edit that file.

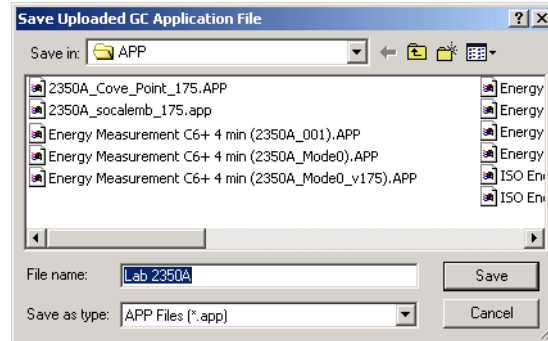
When connected to the GC, this function allows you to upload the current GC application data from the GC Controller and save to file for future editing. When the application upload is complete the connection will be terminated (i.e., disconnected).

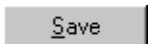
1. Establish a connection to the GC.
2. Use the *File > Offline Edit > Upload Application* menu to access this function.



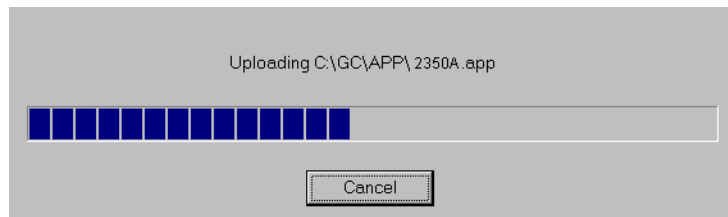


3. The Save Uploaded GC Application File menu appears.

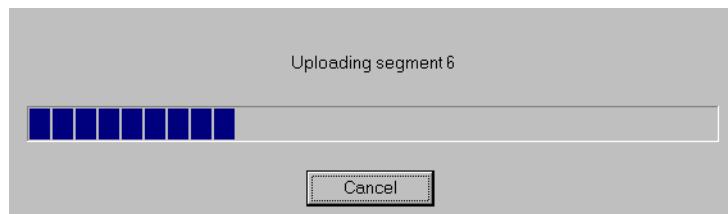


Use this dialog to choose the directory and file name or create a special file name for this particular application upload. Click the  button.

4. MON2000 displays the message “Uploading C:\GC\APP\2350A.app” in the progress status bar.



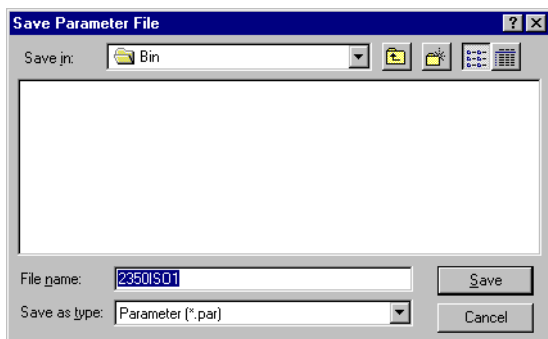
MON2000 continues with the upload process and displays the message, “Uploading Segment 1 (through segment 15)” in the status bar and a progress bar appears.




Once all of the segments are uploaded and the application file (.app) has been saved,

MON2000 prompts you to save the parameters file.

- The Save Parameter File dialog appears.

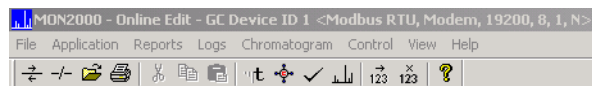
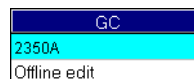


Use this dialog to choose the directory location and file name or create your own parameter file name. Click the  button to continue.

- MON2000 saves the parameter data to the selected directory. When the upload is complete, your connection to the GC unit is automatically terminated.
- You are now viewing the uploaded application file off-line.

You can edit this application by using the MON2000 Application functions (see [Section 5](#) for more information).

Note that the application file name is displayed in the GC status dialog and the File Edit mode is displayed in the main screen titlebar.

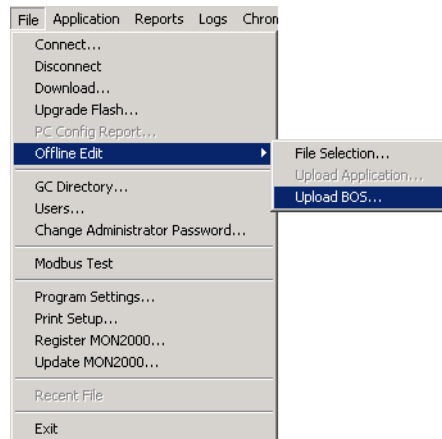


When you have finished editing this file, you can download it to the GC Controller (see [Section 2.17](#)) or save for future use.

### 2.19.3 Upload BOS

When connected to the GC, this function allows you to upload the current BOS (i.e., firmware) file from the GC Controller to save for future download (see [Section 2.18](#)).

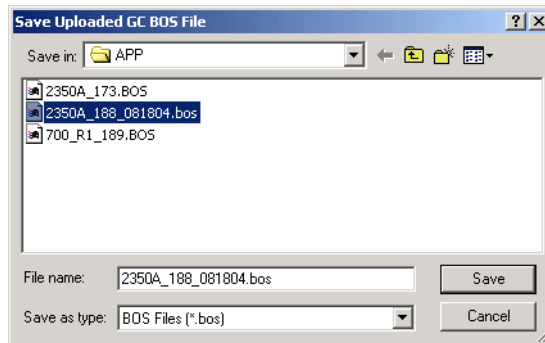
1. Use the *File > Offline Edit > Upload BOS* menu to access this function.




## NOTICE

By default, GC BOS files are stored in C:\GC\APP folder.

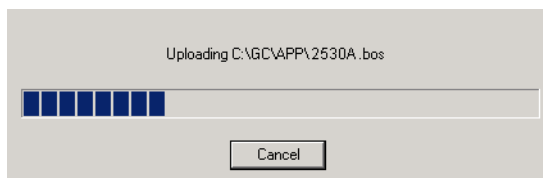
2. The Save Uploaded GC BOS File dialog appears.



3. Use this dialog to choose the directory location and file name or create a file name for this particular upload. Click the  button to continue.

The message:

“Uploading C:\GC\APP\2350A.bos”  
appears in the status bar and a progress bar appears.



4. MON2000 begins to upload the BOS to the selected file. When the upload is complete, normal MON2000 operations resume.

## NOTICE

**MON2000 will not perform a BOS upload during an analysis run. You must halt the analysis first (see [Section 4.3](#)) or wait until the GC is idle.**

## NOTICE

**A BOS upload usually takes 10 minutes to complete.**

## GETTING STARTED

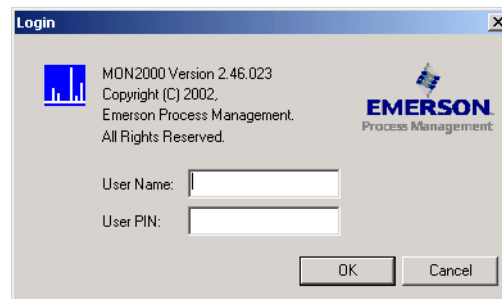
This section shows you how to get started with the MON2000 software, covering such functions as logging on, navigation, and configuring your PC printer for MON2000.

### 3.1 LOGGING ON

To log on,



1. Start the MON2000 software program by clicking the desktop icon or using the Windows® Start menu (see [Section 2.7](#)).



2. Click the *User Name* data field and type your assigned user name (up to 12 characters). Note that the user name is not case-sensitive and can include characters such as "\*", "-", ".", etc.

3. If required, click the *User PIN* data field and type your assigned PIN.

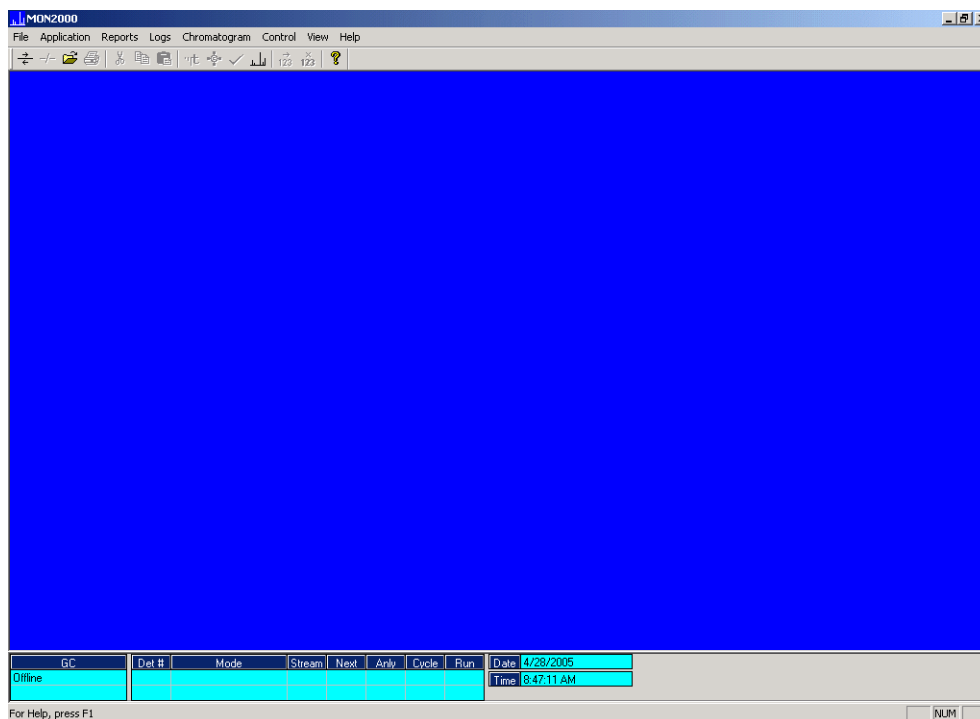
## NOTICE

If you enter an incorrect user name or user PIN, a error message appears:



Click the  button to exit and return to the Logon dialog.

4. When you have successfully logged on, the MON2000 main window appears.




**NOTICE**

Ensure that you exit the MON2000 program and shut down Windows before powering off the PC.

**3.2 LOGGING OFF**

To log off,

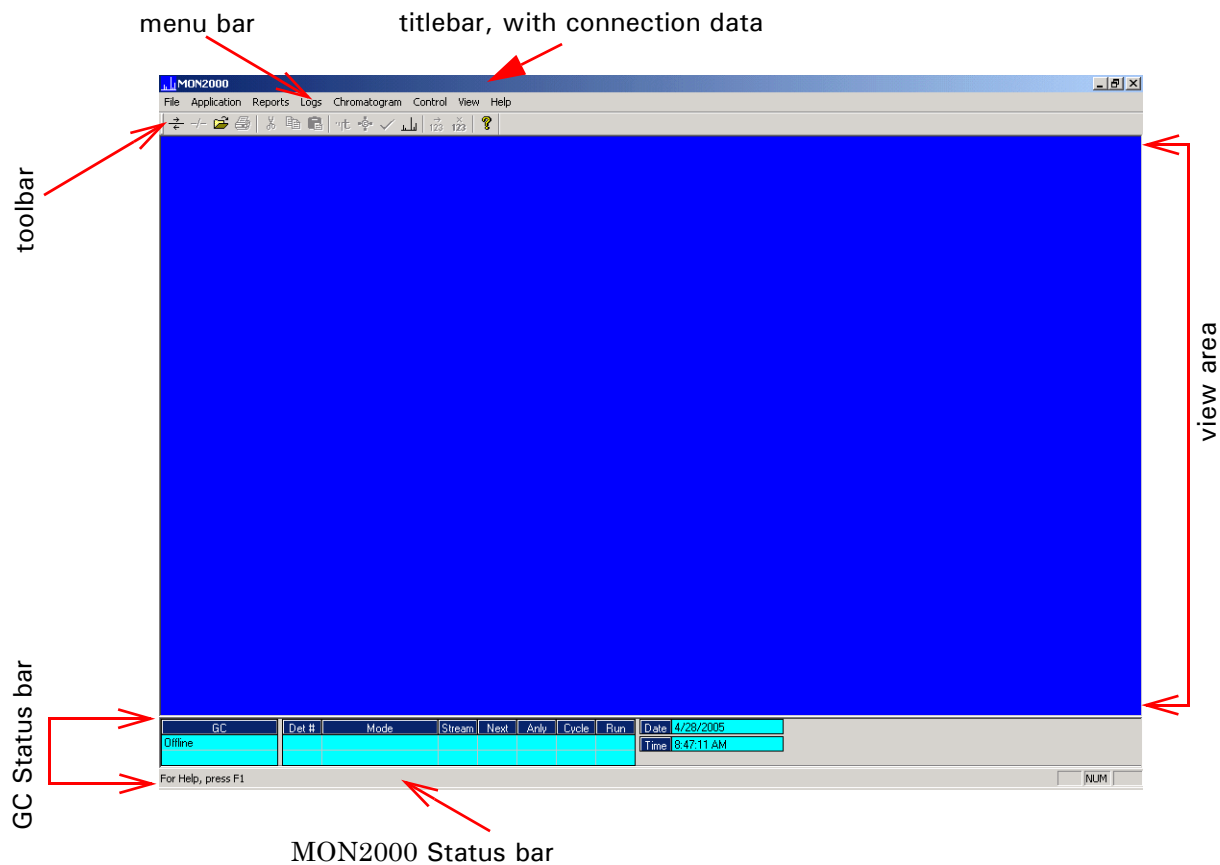
1. Disconnect from the GC unit (see [Section 2.10.2](#)).
2. Exit the MON2000 program by
  - using the *File > Exit* menu
  - pressing the ESC key
  - clicking the  button

**3.3 MON2000 USER INTERFACE**

Use the following sections to familiarize yourself with the MON2000 user interface.

### 3.3.1 Main Window

The MON2000 main window typically looks like this:



Use the available menus, icons (see toolbar area and [Section 3.3.4](#)), and function keys (see [Section 3.4](#)) to access the desired functions.



### 3.3.2 GC Status Bar

The status bar appears across the bottom of the application window. To display or hide the status bar, click the Status Bar command using the *View* menu (ALT + V, G).

Access this menu command from the *View* menu (ALT+ V, S) to display and hide the GC Status Bar, which displays the following:

GC	Det #	Mode	Stream	Next	Anly	Cycle	Run	Date
Back 2350A	1	Auto Anly	1	1	230	240	36	5/17/2005
Unack'd alarm								Time 12:48:54 PM

- GC - name of the GC currently online
- Alarm status (Unacknowledged)
- Detector number
- Mode (e.g., analysis; Calibration mode or Analysis mode)
- Streams - number current streams
- Next - next stream number to run)
- Anly - analysis cycle
- Run - run time
- Date - current date is displayed
- Time - current time is displayed

The left area of the status bar describes actions of menu items as you use the mouse pointer over the menu selection. This area similarly shows messages that describe the actions of toolbar buttons as you press and hold them. After viewing the description of the toolbar button command and you do not wish execute the command, move the mouse pointer away from the toolbar command, then release the mouse button.

The right areas of the status bar indicate which of the following keys are activated:

<b>Indicator</b>	<b>Description</b>
CAP	the Caps Lock key is ON.
NUM	the Num Lock key is ON
SCRL	the Scroll Lock key is ON



## **NOTICE**

Your connection status is also displayed in the titlebar.

If “Online Edit” appears, then MON2000 is connected to the GC and is recognizing the existing application.

If “Connected” appears, then MON2000 is connected to the GC but does not recognize the existing application.

If no connection data is displayed, there is no connection.

The GC Status bar consists of:

<b>Item</b>	<b>Description</b>
GC	GC unit to which MON2000 is currently connected  A status flag indicates an active alarm, an unacknowledged alarm, or the File Edit mode (offline editing).
Det #	detector monitoring the alarm status of the currently connected GC  A GC unit can have up to 2 detectors.
Mode	mode of the Detector  Typical modes are: <ul style="list-style-type: none"> <li>• Idle</li> <li>• Auto Cal</li> <li>• Auto Base</li> <li>• Auto Anly</li> <li>• FCal</li> </ul>
Stream	current stream being analyzed
Next	next sample stream to be analyzed
Anly	analysis time
Cycle	total cycle time (seconds), selected before starting another analysis
Run	time (seconds) elapsed since current cycle began
Date/Time	date and time, per PC clock

### 3.3.3 View Menu

Use the *View* menu to toggle (i.e., switch ON or OFF) which main window component you wish to view. See Section 3.3.1 for an identification and definition of each component.



### 3.3.4 ToolTips

To view a ToolTip, move the mouse cursor to the Toolbar icon you want identified. MON2000 displays the ToolTip for five seconds.

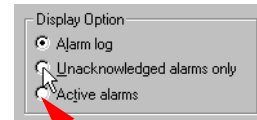
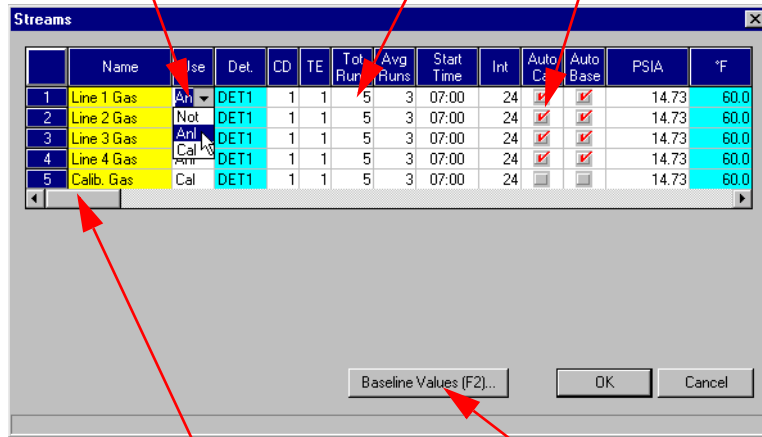
### 3.3.5 Data Entry and Function Features

Use the data boxes, buttons, check boxes, and toggles to input data or to choose options and activate features.

click check box to turn setting ON or OFF

use dynamic pull-down menus to select option

type input in data fields



click radio button to select option

scroll to access additional settings

click push-buttons to activate features



### 3.3.6 Shortcut to Save or Print Data

From any active dialog, right-click the displayed data to access this menu.

Choose the *Save Sheet* option to save data to disk or the *Print Sheet* option to queue data to your PC printer. MON2000 prints the report to your configured printer (see [Section 3.7](#)).

## NOTICE

**Microsoft Internet Explorer 5.0 (or later) is required to view a spreadsheet file saved in HTML format.**

## 3.4 KEYBOARD SHORTCUTS

MON2000 supports keystrokes as well as a standard PC mouse interface. Use a mouse to perform point-and-click operations.

Refer to the following table for common keyboard shortcuts. See [Table 3-2](#) for function keys that can be used after an application has been downloaded to the GC Controller.

*Table 3-1 Frequently Used Keystrokes*

Keystroke	Action
ARROW keys	Move cursor: <ul style="list-style-type: none"> <li>• left or right in a data field</li> <li>• up or down in a menu or combo box</li> <li>• up or down (column), left or right (row) through displayed data entries</li> </ul>
DELETE	<ul style="list-style-type: none"> <li>• Delete the character after cursor.</li> <li>• Delete selected rows from a table or return row values to the default settings.</li> </ul>
ENTER	<ul style="list-style-type: none"> <li>• Add a blank item or row to selected table.</li> <li>• Activate the default control element (e.g., the OK button) in current window.</li> </ul>
ESC	Exit application or active window without saving data.
F1	Access context-sensitive help topic.
INSERT	<ul style="list-style-type: none"> <li>• Toggle between insert and type-over mode in selected cell.</li> <li>• Insert a new row above the highlighted row.</li> </ul>
SHIFT+TAB	Move to previous control element (e.g., button) or data field in window; see TAB description.

Table 3-1 Frequently Used Keystrokes (Continued)

Keystroke	Action
SPACE	Toggle settings (via radio buttons or check boxes).
TAB	Move to next control element (e.g., button) in window; use File > Program Settings (see Section 2.16.2) to use TAB key to move to next data field.

Table 3-2 Application-Specific Function Keys

Function Key	Action
F2	Start Auto Sequence
<div style="background-color: #0070C0; color: white; padding: 5px; display: inline-block; font-weight: bold; font-size: 1.2em;">NOTICE</div> <p><b>These keystrokes are available from the main menu only. Function key definitions will change per the active dialog/function.</b></p>	
	Starts the Auto-Sequencing function (see Section 4.1).
F3	Halt
	Halts the GC program (e.g., an analysis run) at the end of the current cycle (see Section 4.3).
F5	Edit TEVs
	Displays the Timed Event Table (TEV) per specified stream (see Section 5.3).
F6	Edit CDTs
	Displays the Component Data Table (CDT) per specified stream (see Section 5.2).
F7	View Current CGM
	Displays the chromatogram for the sample stream being analyzed (see Section 6.1).
F8	View Last GC CGM
	Displays any chromatogram stored in the GC Controller (see Section 6.1).

### 3.5 PROCEDURES GUIDE

Use the following table to look up the related manual section and menu (and keystroke) for a given procedure.

*Table 3-3 Menu and Manual Section per MON2000 Procedure*

<b>Task or Data Item</b>	<b>Section(s)</b>	<b>Menu [Keystroke]</b>
24-Hour Average, component(s) measured	5.5.2	Application > Calculations > Averages
alarms, related components	5.2 5.6 5.7 5.12	Application > Component Data [F6] Application > Limit Alarms Application > Discrete Alarms Application > Discrete Outputs
alarms, stream number(s) programmed	5.6	Application > Limit Alarms
Analysis Report (on/off)	7.3 7.4	Reports > GC Printer Control Reports > MON2000 Printer Control
analysis time	5.3	Application > Timed Events [F5]
auto-calibration (on/off)	5.8	Application > Streams
Auto-Calibration Interval	5.8	Application > Streams
Auto-Calibration Start Time	5.8	Application > Streams
autocal time	5.8	Application > Streams
Baseline	5.8	Application > Streams, Baseline Values [F2]
base pressure used for calculations	5.8	Application > Streams
BTU-dry (on/off)	5.5.1	Application > Calculations > Control
calibration concentration	5.2	Application > Component Data [F6]
calibration cycle time	5.3	Application > Timed Events [F5]
calibration runs, number averaged	5.8	Application > Streams
calibration runs, number of	5.8	Application > Streams
calibration stream number	5.8	Application > Streams
communications baud rate, at GC	5.17	Application > Serial Ports

Table 3-3 Menu and Manual Section per MON2000 Procedure (Continued)

<b>Task or Data Item</b>	<b>Section(s)</b>	<b>Menu [Keystroke]</b>
communications baud rate, at PC	2.11.3	File > (COM ID)
component code and name	5.2	Application > Component Data [F6]
component full scale (for output)	5.1 5.10	Application > System (CGM Analog Output Config and Baseline Offset) Application > Analog Outputs
component(s) programmed for input	5.9 5.11	Application > Analog Inputs Application > Discrete Inputs
component(s) programmed for output	5.6 5.7 5.10 5.12	Application > Limit Alarms Application > Discrete Alarms Application > Analog Outputs Application > Discrete Outputs
component, retention time	5.2	Application > Component Data [F6]
component zero (for output)	5.10	Application > Analog Outputs
Compressibility (on/off)	5.5.1	Application > Calculations > Control
current date	4.7	Control > GC Time
current time	4.7	Control > GC Time
cycle time	5.3	Application > Timed Events [F5]
delete alarms	5.6 8.3	Application > Limit Alarms Log > Alarm Log
delete component from component list	5.2	Application > Component Data [F6], [DELETE]
delete inhibit, integration, peak width	5.3	Application > Timed Events [F5]
delete output(s)	5.6 5.7 5.10 5.12	Application > Limit Alarms Application > Discrete Alarms Application > Analog Outputs Application > Discrete Outputs
edit numeric value	5.4.1	Application > User Defined > Numeric
edit select values	5.4.2	Application > User Defined > Selection
edit text strings	5.4.3	Application > User Defined > Text Strings



*Table 3-3 Menu and Manual Section per MON2000 Procedure (Continued)*

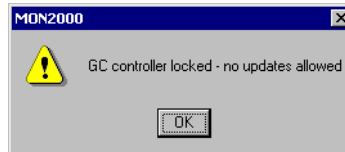
<b>Task or Data Item</b>	<b>Section(s)</b>	<b>Menu [Keystroke]</b>
existing alarm(s)	8.3	Log > Alarm Log
full-scale value (for input)	5.9	Application > Analog Inputs
GPM liquid equivalent (on/off)	5.5.1	Application > Calculations > Control
height or area measurement method	5.2	Application > Component Data [F6]
High Alarm	5.6	Application > Limit Alarms
(Analyzer) I.D.	2.11.2 5.1	File > GC Directory Application > System
inhibit on-off times	5.3	Application > Timed Events [F5]
input(s) being used	5.9 5.11	Application > Analog Inputs Application > Discrete Inputs
integration on-off times	5.3	Application > Timed Events [F5]
Low Alarm	5.6	Application > Limit Alarms
Mole percent (on/off)	5.5.1	Application > Calculations > Control
Normalization (on/off)	5.5.1	Application > Calculations > Control
outputs being used	5.6 5.7 5.10 5.12	Application > Limit Alarms Application > Discrete Alarms Application > Analog Outputs Application > Discrete Outputs
Peak Width, on time	5.3	Application > Timed Events [F5]
Ratio (on/off)	5.5.3	Application > Calculations > User Defined
Ratio Denominator	5.5.3	Application > Calculations > User Defined
Ratio, stream number(s)	5.5.3	Application > Calculations > User Defined
Relative Density (on/off)	5.5.1	Application > Calculations > Control
Response Factor	5.2	Application > Component Data [F6]
Response Factor, percent deviation	5.2	Application > Component Data [F6]
Retention Time, percent deviation	5.2	Application > Component Data [F6]
Rolling Average (on/off)	5.5.2	Application > Calculations > Averages

*Table 3-3 Menu and Manual Section per MON2000 Procedure (Continued)*

<b>Task or Data Item</b>	<b>Section(s)</b>	<b>Menu [Keystroke]</b>
Rolling Average, component for	5.5.2	Application > Calculations > Averages
Rolling Average, number of analyses	5.5.2	Application > Calculations > Averages
Rolling Average, stream number(s)	5.5.2	Application > Calculations > Averages
Spectrum Gain	5.3	Application > Timed Events [F5]
stream number(s) (for output)	5.6 5.7 5.10 5.12	Application > Limit Alarms Application > Discrete Alarms Application > Analog Outputs Application > Discrete Outputs
stream sequences skipped, number	5.1 5.8	Application > System Application > Streams
streams analyzed, number	5.1 5.8	Application > System Application > Streams
streams analyzed, sequence	5.1 5.8	Application > System Application > Streams
Valve on/off times	5.3	Application > Timed Events [F5]
Weight Percent (on/off)	5.5.1	Application > Calculations > Control
Wobbe value (on/off)	5.5.1	Application > Calculations > Control
Zero value (for input)	5.9	Application > Analog Inputs

### 3.6 KEYLOCK SWITCH CONTROL

If your GC unit has the keylock control enabled, you will not be able to write changes or new data to the GC Controller. The following error dialog will display.



To see which Modbus registers are affected by the keylock control, view the Communications section of the PC Config Report via the Report Viewer (see [Appendix A](#) for instructions and an example).

When closed ('on'), the GC keylock switch protects many of the GC Controller's parameters from being changed using MON2000.

Most of the dialog boxes in the Application's menu allows you to view data but does not allow you to save changes when the keylock switch is closed. Several items in the Reports and Control menus are unavailable when the keylock switch is closed. The Users dialog cannot be downloaded to the GC Controller when the keylock switch is closed. A GC application cannot be downloaded to the GC Controller when the keylock switch is closed.

#### NOTICE

**The keylock switch affects only online operations, i.e. those that are performed while connected to a GC Controller.**

**The keylock switch feature is only available on controllers with BOS version 1.6 and later. The GC Controller parameters protected by the keylock switch may vary slightly from version to version.**

Since most of the GC Controller's parameters are protected by the keylock switch, it is easiest to list the operations that are available when the keylock switch is closed. The following operations are available when the keylock switch is closed:

The stream sequences can be changed in the System dialog box. (GC applications version 1.7 and above.)

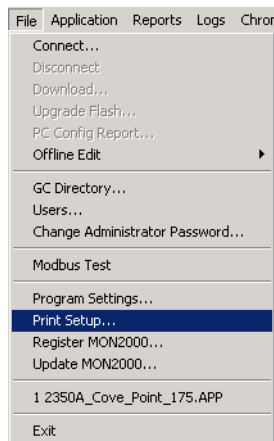
- Automatic calibration in the Analog Outputs dialog box
- Report display
- GC report request (GC applications version 1.7 and above)
- MON2000 printer control (GC applications version 1.7 and above)
- View archive data
- Trend data
- Maintenance Log editing (GC applications version 1.7 and above)
- Alarms (except clear/ack all active alarms)
- Event log
- Chromatogram viewer (including forced calibration using archived chromatograms)
- Start Auto-Sequencing
- Start single stream
- Halt analysis
- Start calibration
- View and set GC time (GC applications version 1.7 and above)

### 3.7 CONFIGURING YOUR PRINTER

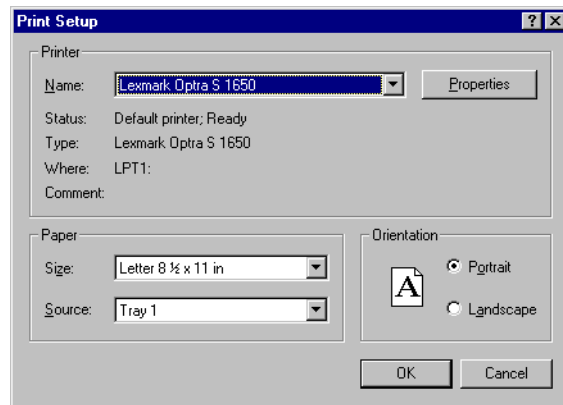
Use this function to configure the settings for the printer connected to your PC. This configuration will apply to any print job queued from MON2000.

The settings available depend on the printer type. Refer to the manufacturer's user manual for more information.

1. Use the *File > Print Setup* menu to access this function.




2. The Printer Setup dialog appears.



## NOTICE

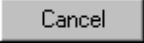
Your configuration will be cleared (i.e., the settings will return to the default values) when you exit MON2000.

3. Use the provided data fields, radio buttons, check and combo boxes to select the desired settings.

Click the  button to configure more advanced settings.

Refer to the printer operator manual for more information.

4. Click the  button to queue the printer.

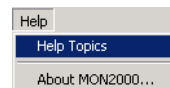
Click the  button to abort and return to the main window.

### 3.8 USING ONLINE HELP

Currently, the online help feature contains all user information and instructions for each MON2000 function as well as the MON2000 system.

To access the MON2000 Application Help file,

- Press the F1 key at any time to view help topics that discuss the currently active dialog or function.
- Use the *Help > Help Topics* menu to view the help contents dialog.



Use the scroll bars and arrows to display more of a topic. You can also resize and/or move the topic dialog for better viewing convenience.

When applicable, a topic will contain links to other related topics, notes, and helpful popups. Use these links as you need.

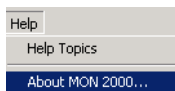
### 3.9 OPERATING MODES FOR MODEL 700

The Model 700 GC supports four different operating modes. Each mode allows the GC to analyze data from a given number of detectors, streams, and methods. See [Table 3-4](#) for more information.

*Table 3-4 Operating Modes for Model 700*

<b>Mode ID Number</b>	<b>Detectors Supported</b>	<b>Streams Supported</b>	<b>Methods Supported</b>
0	1	1	1
1	2	1	1
2	2	2	2
3	2	1	2

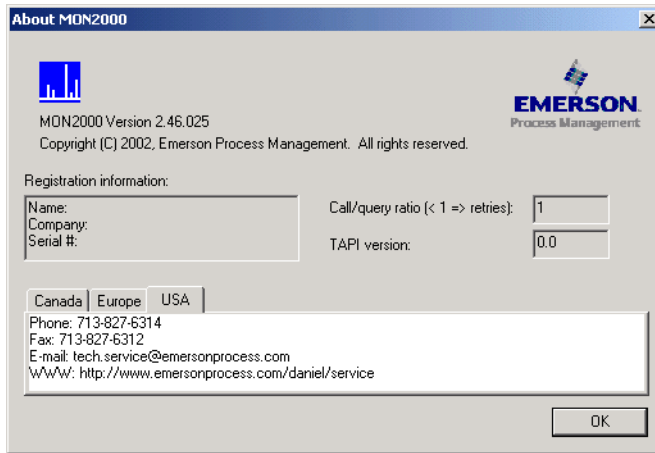
### 3.10 ABOUT MON2000



To verify information such as the software version number, copyright date, and the call/query ratio.

1. Use the *Help > About MON2000* menu to access this dialog.

2. MON2000 appears the About MON2000 dialog.



The *Call/Query Ratio* estimates the quality of your serial communications. If this ratio is less than or equal to 0.5, then the connection is problematic. The maximum value of 1 indicates a good connection.

The *TAPI version* represents the Telephony API software MON2000 accesses for dial-up (i.e., remote) communications.

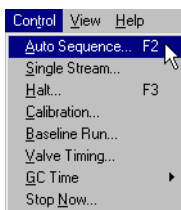
3. Click the  button to exit and return to the main window.



## CONTROL FUNCTIONS

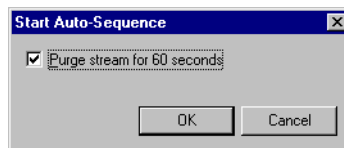
The options in the Control pull-down menu allow you to initiate various operating modes of the gas chromatograph (GC) unit.

### 4.1 AUTO SEQUENCE




Use this function to start continuous GC analysis runs that follow a predefined stream sequence. At the initial startup, the current stream (in the stream sequence) is the first stream analyzed. See Section 5.8 for detailed instructions on configuring the predefined sequence.

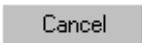
1. Use the *Control > Auto Sequence* menu or press the F2 key to access this function.
2. The Start Auto Sequence dialog appears.



3. Click the *Purge* check box to set the purging option. Note that the default setting is ON.

Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis.

4. Click the  button to continue.

Click the  button to abort and return to the main window.

5. The Auto Sequence GC Analysis begins (if you selected the Purge Stream option, MON2000 performs this 60-second task first).

## NOTICE

Use the Report Display option in the Reports menu to view the results of the Auto Sequence function.

Use the status bar to monitor the progress of this function.

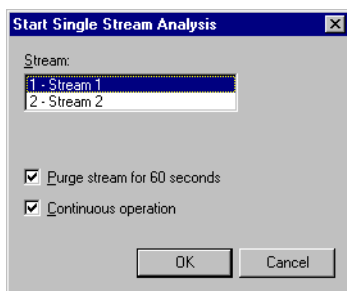
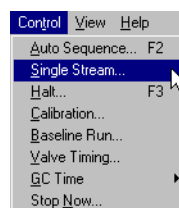
To change the operating parameters, such as the Timed Event Tables (TEVs) and Component Data Tables (CDTs), See [Section 4](#) for information about Application functions.

Det #	Mode
1	Auto Prge

## 4.2 SINGLE STREAM

Use this function to start continuous GC analysis run(s) on a single stream.

1. Use the *Control > Single Stream* menu to access this function.
2. The Start Single Stream Analysis dialog appears.



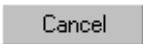
3. Select the desired stream from the Stream menu.
4. Click the *Purge* check box to set the purging option. Note that the default setting is ON.  
Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis.
5. Click the *Continuous operation* check box to perform repetitive analysis runs. Note that the default setting is ON.

Deselect this option if you want to perform only one analysis run.

**NOTICE**

Use the Report Display option in the Reports menu to view the results of the Single Stream function.

6. Click the  button to accept your selections and continue.

Click the  button to abort and return to the main window.

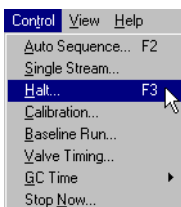
7. The Single Stream GC Analysis begins (if you selected the Purge Stream option, MON2000 performs this 60-second task first).

Use the status bar to monitor the progress of this function.

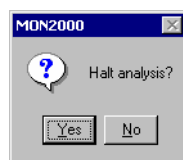
Det #	Mode
1	Manual Prge


### 4.3 HALT


Use this function to stop the current operation mode at the end of the run in progress.



1. Use the *Control > Halt* menu or press the F3 key to access this function.
2. MON2000 prompts you to confirm your selection.



Click the  button to proceed.

Click the  button to abort and return to the main window.

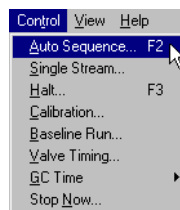
3. After the current run finishes, the function stops and “Idle” appears in the status bar.

Det #	Mode
1	Idle

## 4.4 CALIBRATION

Use this function to calibrate the GC unit.

Calibration runs are determined by the CDT and Streams settings. See [Section 5.2](#) and [Section 5.8](#) for detailed instructions on how to edit these settings.

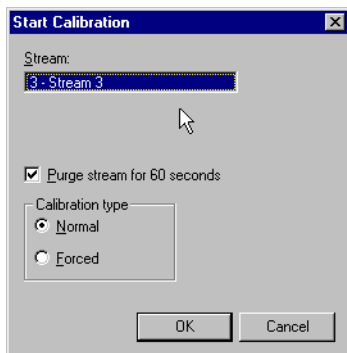


1. Use the *Control > Calibration* menu to access this function.

### NOTICE

If the GC unit is in Auto Sequence mode, calibration will not start until 2 or more analysis runs have been completed. This delay is required to complete the current analysis and the analysis of the stream currently purging through the valve.

2. The Start Calibration dialog appears.



MON2000 displays the stream to be used for the calibration.

To select which stream is used for calibration, see [Section 5.8](#).

3. Click the *Purge* check box to set the purging option. Note that the default setting is ON.

### NOTICE

See [Section 7.1](#) to select report parameters.

**NOTICE**

For either choice, only VAR (variable) components on the CDT are updated. See Section 5.2 for details.

**NOTICE**

Use the Report Display option in the Reports menu to view the results of the Calibration function.

Det #	Mode
1	Manual Prge

Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis.

4. Select the desired calibration type.
  - (a) Click the *Manual* radio button to perform a manual calibration.

The CDT for the selected stream(s) will not be updated with raw data that are outside the acceptable deviations (as listed on the CDT). For more information, See Section 5.2.

- (b) Click the *Forced* radio button to perform a manual calibration.

The CDT for the selected stream(s) will be updated with raw data that are outside the acceptable deviations (as listed on the CDT). For more information, See Section 5.2.

5. Click the  button to accept your selections and continue.

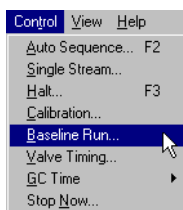
Click the  button to abort and return to the main window.

6. The Calibration begins.

Use the status bar to monitor the progress of this function.

**4.5 BASELINE RUN**

Use this function to initiate a single GC baseline run, to assess chromatogram peaks caused by the GC valve action alone. A baseline run is a calibration-like run during which no calibration or sample gas is injected (i.e., the valve is not fired).

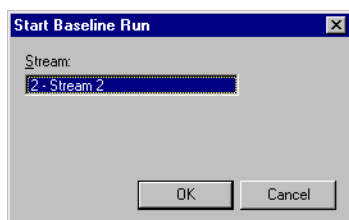


1. Use the *Control > Baseline Run* menu to access this function.

## NOTICE

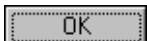
If the GC unit is in Auto Sequence mode, MON2000 prompts that the continuous analysis must be stopped. Halt the analysis (See Section 4.3) and wait for an Idle status. Then continue initiating the baseline run.

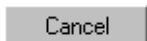
2. The Start Baseline Run dialog appears.



MON2000 displays the stream to be used for the baseline run.

To select which stream is used for the baseline calibration, See Section 5.8.

3. Click the  button to continue.

Click the  button to abort and return to the main window.

Use the status bar to monitor the progress of this function. Use the Report Display option in the Reports menu to view the results of the Baseline Run function?

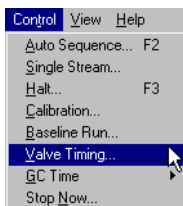
Det #	Mode
1	Baseline

## 4.6 AUTO BTU START UP AND VALVE TIMING

The *Auto BTU Start Up* process, which takes about an hour to complete, automatically performs the following sequence of tasks:

1. Sets the timing for each valve.
2. Matches all the component peaks.
3. Adjusts the timed events based on peak integration times.
4. Runs a calibration.
5. Checks the range and order of response factors.
6. Adjusts the retention time deviations to avoid peak overlapping.

You can also initiate a valve timing run, which is the first step of the *Auto BTU Start Up* process, independently of that process. See [“Starting a Valve Timing Run” on page 12](#) for more information.



### 4.6.1 Initiating an Auto BTU Start Up Run

To launch the *Auto BTU Start Up* process, do the following:

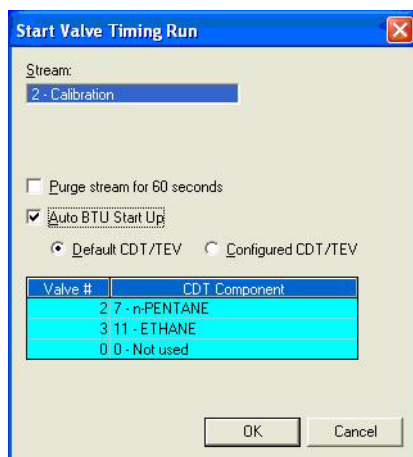
1. If the GC is currently performing an analysis, select *Halt* from the *Control* menu to put the GC in Idle mode after the current analysis run.

2. Select *Valve Timing* from the *Control* menu.  
The Valve Timing window displays.



MON2000 displays in the *Stream* field the calibration stream(s) to be used for the Auto BTU Start Up run.

3. Select the *Auto BTU Start Up* checkbox.
4. To use the default Component Data and Timed Event tables, select the Default CDT/TEV checkbox.





**NOTICE**

It is strongly recommended that you use the Default CDT/TEV.

When the Default CDT/TEV checkbox is selected, the Valve # and CDT Component fields are read-only.

5. To use the GC's existing CDT/TEV tables, select the Configured CDT/TEV checkbox.



You can enter a valve number in the Valve # field and select the component number from the drop-down list of the CDT Component field in the table below the checkboxes. The list of components are from the CDT of the corresponding calibration stream.

**NOTICE**

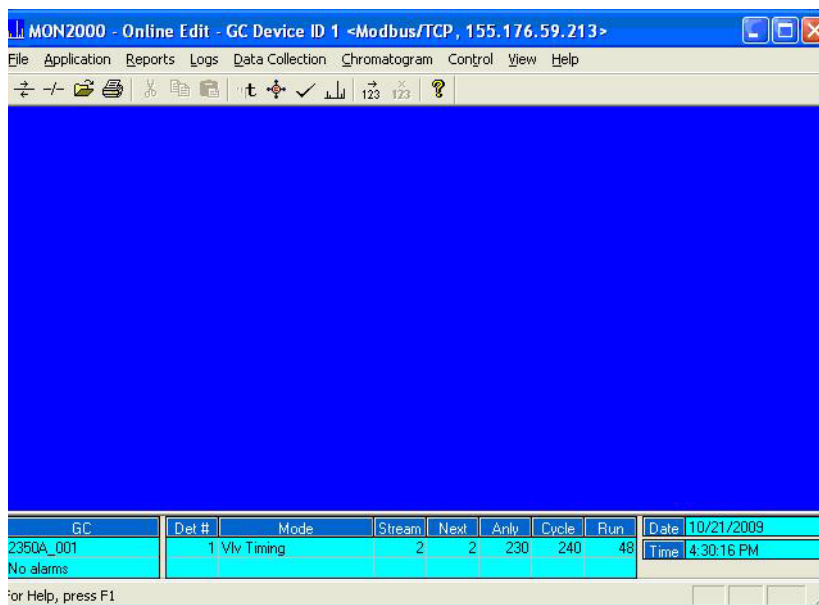
neo-Pentane is not available in the CDT Component drop-down list.

- To allow sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis, click the *Purge stream for 60 seconds* check box.

## NOTICE

It is strongly recommended that you check the *Purge stream for 60 seconds* check box.

- Click **OK** to begin the Auto BTU Start Up process. When the process starts, the GC Status window indicates that the GC is in **Vlv Timing** mode.



If the Auto BTU Start Up run fails, an alarm will be triggered and displayed in the Alarm Log.

## NOTICE

The following six potential system alarms can be triggered during the Auto BTU Start Up process:

- Valve Timing 1 Failure: Triggered if the timing for valve 1 cannot be determined after a ten second change of VALVE OFF time.
- Valve Timing 2 Failure: Triggered if the timing for valve 2 cannot be determined after a ten second change of VALVE OFF time.
- Valve Timing 3 Failure: Triggered if the timing for valve 3 cannot be determined after a ten second change of VALVE OFF time.
- Auto BTU RT Failure - Missing Peaks: Triggered if not all the peaks are found after running the calibration stream to match all component peaks.
- Auto BTU Response Factor Failure: Triggered if all of the response factors are not within +/- 50% of the default values after the calibration runs.
- Auto BTU Calib Failure - RF Order: Triggered if the response factors are not in the proper order after the calibration runs.

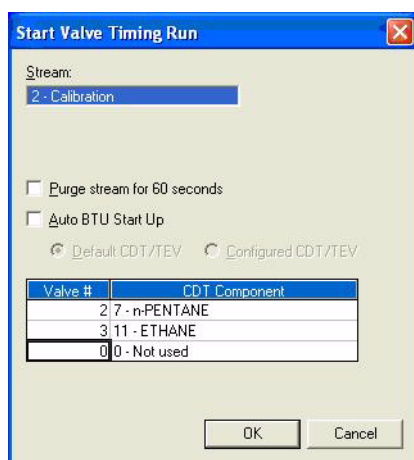
A triggered alarm will be posted in the Alarm Log. See [Section 8.3](#) for detailed instructions on reading Alarm Logs.

## 4.6.2 Starting a Valve Timing Run

### NOTICE

If the GC is in Auto Sequence mode, halt the analysis (See Section 4.3) and then return to the Valve Timing window.

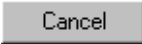
1. Select *Valve Timing* from the *Control* menu. The Start Valve Timing Run dialog appears.
2. If the Auto BTU Start Up checkbox is selected, uncheck it. The valve timing feature is now enabled.



3. MON2000 displays in the *Stream* field the calibration stream(s) to be used for the valve timing run.
4. To allow sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis, click the *Purge stream for 60 seconds* check box..

5. You can enter a valve number in the Valve # field and select the component number from the drop-down list of the CDT Component field in the table below the checkboxes. The list of components are from the CDT of the corresponding calibration stream.

6. Click the  button to accept your selections and to continue.

Click the  button to abort and return to the main window.

7. The Valve Timing run begins.

If no change was made to a valve's timing, the following message will be posted in the Alarm Log: "Valve Timing *N* Failure", where *N* is the ID number for the valve. See [Section 8.3](#) for detailed instructions on reading Alarm Logs. If all valves are successfully optimized, no messages will be recorded.

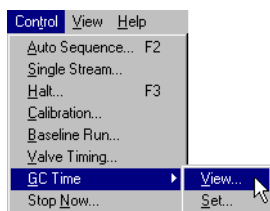
## 4.7 GC TIME

Use the GC Time function to view and, if necessary, set the system date and time used by the GC Controller.

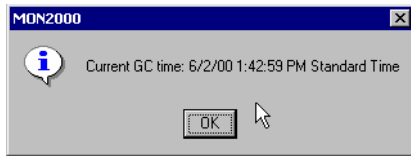
### 4.7.1 View GC Time

To view the system date and time used by the GC, do the following:

1. Use the *Control > GC Time > View* menu to select the View option.



- The following MON2000 dialog appears.

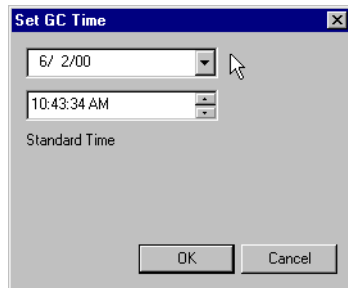


- Click the **OK** button to exit this dialog and return to the main window.

#### 4.7.2 Set GC Time

To set the system date and time used by the GC,

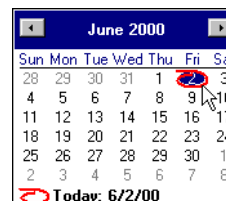
- Use the *Control > GC Time > Set* menu to select the Set option.
- The Set GC Time dialog appears. MON2000 indicates whether the GC Controller is on daylight saving or standard time, which depends on the configured system parameters.



- Use the provided pull-down arrow to access an interactive calendar.


Click the left/right arrows to view the previous or future months.

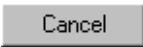
Click the desired day for the date. Note that a blue oval appears on the selected day.



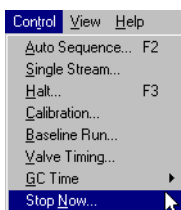
- Select which part of the time (hour, minute, or seconds) you wish to change. Use the

provided scroll arrows to increase or decrease the highlighted value.

5. Click the  button or press the enter key to write the selected date/time to the GC Controller.

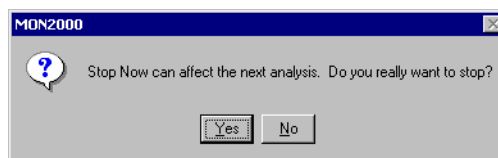
Click the  button to abort and return to the main window.


## 4.8 STOP NOW




Use this function to *immediately* stop all analysis runs.

1. Use the *Control > Stop Now* menu to access this function.
2. MON2000 prompts you to confirm your selection.



Click the  button to proceed.

Click the  button to abort and return to the main window.

### NOTICE

**This function forces the system to the Idle mode. If Stop Now is performed while an analysis is in progress, the components will continue to elute from the columns per the Idle mode. All resultant data will be lost.**

**Do not perform a Stop Now unless absolutely necessary. Whenever possible, use the Halt function.**

3. Any GC function in progress is stopped. The Mode field in the status bar displays 'Idle'.

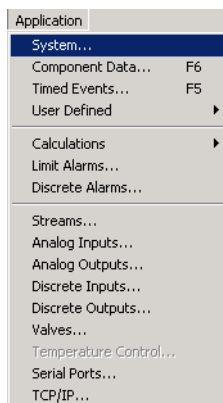
Det #	Mode
1	Idle



## APPLICATION FUNCTIONS

The options in the Application pull-down menu allow you to manipulate or edit the control settings that exist for particular gas chromatograph (GC) application functions. You can edit an application while online with the GC Controller or when using the Offline Edit function (see [Section 2.19](#) for information on Offline Edit; see [Section 2.17](#) to download an application first).

### 5.1 SYSTEM

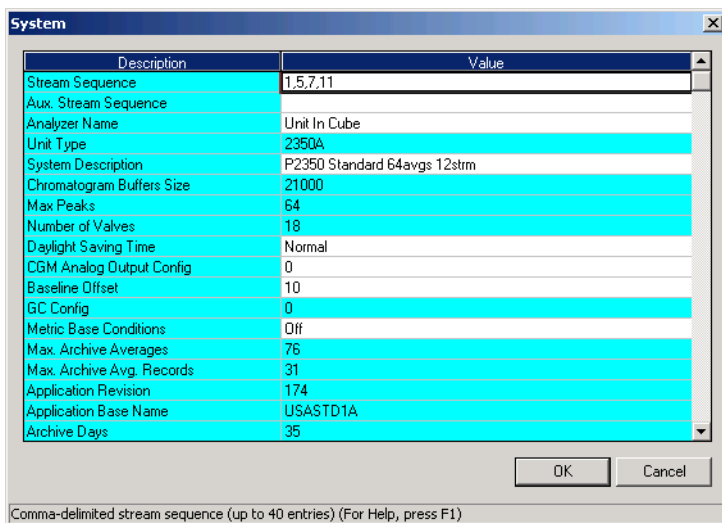


Use this function to define or edit the GC stream sequence, unit name, and system description. You can also use this function to activate Metric Base Condition for calculations based on metric units.

The System dialog also includes a series of non-editable fields for reference or trouble shooting. See [Table 5-1](#) for a summary of the items provided by the System dialog, along with the related functions and editing status.


1. Use the *Application > System* menu to access this function.

2. The System dialog appears.



Click and edit any value presented in the white cells.

Note that the *Daylight Savings Time* option, when set to "Override," will make the GC Controller ignore the time change from Standard to Daylight Savings (i.e., Standard Time will remain).

3. Click the  button to accept your changes and return to the main window.

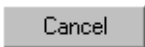
Click the  button to abort and return to the main window.

Table 5-1 Description of Items in System Dialog

Item	Function	Edit
Stream Sequence	Defines the order of stream analysis for Detector 1.	✓
Stream Sequence 2	Defines the order of stream analysis for Detector 2; only available with selected hardware.  Note that this item is not available in all GC applications.	✓
Aux. Stream Sequence	Defines the auxiliary order of stream analysis for Detector 1. Can be used to run an alternative stream sequence when a Discrete Input is set (see Section 5.11 for detailed instructions).  Note that this item is not available in all GC applications.	
Aux. Stream Sequence 2	Additional alternative stream sequence provided for second detector in dual detector applications.  Auxiliary order of stream analysis for Detector 2. Can be used to run an alternative stream sequence when a Discrete Input is set (see Section 5.11 for detailed instructions).  Note that this item is not available in all GC applications.	✓
Analyzer Name	Defines the GC unit name that appears in the status bar of the main window when connected to the GC Controller. Can contain up to 12 characters.	✓
Unit Type	Identifies GC unit type (i.e., model number).	
System Description	A field to record miscellaneous reference information to further identify the system. Can contain up to 28 characters.	✓
Chromatogram Buffer Size	Provides number of bytes used to store a chromatogram.	
Max Peaks	Provides maximum number of peaks (application-specific).	

Table 5-1 Description of Items in System Dialog (Continued)

Item	Function	Edit
Number of Valves	Identifies number of chromatographic valves (application-specific).	
Daylight Savings Time	Allows the GC Controller to adjust automatically for DST. "Normal" enables automatic DST adjustment (United States). "Override" disables automatic DST adjustment.	✓
CGM Analog Output	Displays chromatogram trace signals for strip chart generation from Detectors 1 and/or 2, trace 1 only. Identifies the analog output number.  If this field is set to 0, then no analog output will produce the CGM signal.	✓
<div style="background-color: #0070C0; color: white; padding: 5px; display: inline-block; font-weight: bold; font-size: 1.2em;">NOTICE</div> <p><b>When assigning a CGM Analog Output, also check the Analog Outputs dialog (see Section 5.10). A CGM Analog Output setting that uses a previously assigned analog output number will produce erratic CGM trace output, possibly with incorrect scaling.</b></p> <p><b>Do not assign this item analog output number 1 if the connected GC unit supports bargraph output (see Section 5.10.3 for details).</b></p>		
CGM Baseline Offset	A fixed offset (percent of full scale) added to the CGM analog output to allow the user to conveniently position the chromatogram on a strip chart recorder. Displays chromatogram trace signals for strip chart generation from Detectors 1 and/or 2. Identifies the baseline offset.	✓
CFG Baseline Number	Identifies the Standard GC Application software from which this GC application or configuration was developed (i.e., the number of the standard configuration file that was used to generate the current application).	
Metric Base Condition	Enables (metric) or disables (off) whether MON2000 displays the GC Control Calculation in metric units. See Section 5.5.1 for details.	✓

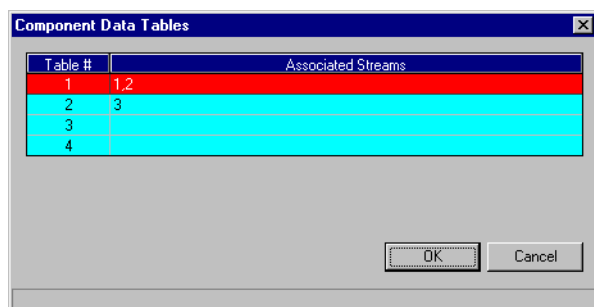
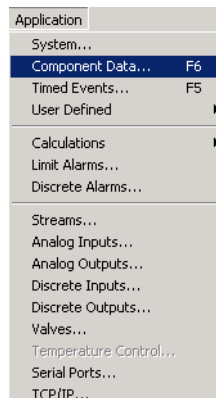
*Table 5-1 Description of Items in System Dialog (Continued)*

<b>Item</b>	<b>Function</b>	<b>Edit</b>
Max Archive Averages	maximum number of averages (1-254)	✓
Max Archive Avg. Records	maximum number of archive records per average without an extended memory card (1-128)	✓
Application Revision	(non-edit) - revision level of the current application	
Application Base Name	(non-edit) - base name of the application	
Archive Days	(non-edit) – maximum number of days that archive records are kept (1-400)	✓
BOS Revision	(non-edit) – revision level of the BOS	

## 5.2 COMPONENT DATA

Use this function to view and/or edit the Component Data Tables (CDTs) for a given GC application.

1. Use the *Application > Component Data* menu or press the F6 key to access this function.
2. The Component Data Tables menu appears, listing the CDTs available per associated stream(s).




Choose the desired CDT.

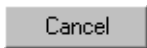
### NOTICE

The number of available CDTs depends on the GC unit configuration.

The standard GC application contains 4 CDTs. MON2000 can operate GC applications with up to 5 CDTs.

To assign a CDT to a stream, see [Section 5.8](#).

3. Click the  button to accept your selection. The Component Data Table dialog appears.

Click the  button to abort and return to the main window.

Component Data Table 1 (Total Concentration = 100.000%)

#	Component	User/Standard	Detector ID	Retention Time	Response Factor	Fixed/Variable	Calibration Concentration	Analysis Method
1	CB+ 47/35/17	Std	1	30.2	2013490	Var	0.0289%	Area
2	PROPANE	Std	1	50.2	1316330	Var	1%	Area
3	IBUTANE	Std	1	65.7	1520820	Fixed	0.3%	Area
4	n-BUTANE	Std	1	73.6	1545350	Var	0.3%	Area
5	NEOPENTANE	Std	1	86.3	1651260	Var	0.1%	Area
6	IPENTANE	Std	1	109.4	1715050	Var	0.0993%	Area
7	m-PENTANE	Std	1	121.6	1793230	Var	0.0999%	Area
8	NITROGEN	Std	1	149.5	782820	Var	2.5%	Area
9	METHANE	Std	1	153.1	637330	Var	89.5719%	Area
10	CARBON DIOXIDE	Std	1	179.2	953088	Var	1%	Area
11	ETHANE	Std	1	200.6	1060440	Var	5%	Area

Std Comps (F2)... Std Values (F3)... Raw Data (F4)... Update STD (F5) Sort RT (F6) OK Cancel

## NOTICE

To add a new component, move the cursor to the last table cell (last row, last column) and press ENTER.

Calibration Concentration	Analysis Method
0.03 %	Area
0.998 %	Area
0.301 %	Area
0.3 %	Area
0.099 %	Area
0.1 %	Area
0.0999 %	Area
2.481 %	Area
89.5909 %	Area
1.0 %	Area
4.999 %	Area
	Height
	Fixed
	AIN1
	AIN2
	AIN3
	AIN4


- View or edit data. Double-click a given table cell or use one of the edit function buttons to make your changes.

Some table cells will change into pull-down menus when selected. Choose your data from the pull-down menu provided.

Note that a red component name indicates a standard component. A black component name indicates that this component has been edited or defined by the user.

For more information on the editing functions available, see [Section 5.2.1](#) through [Section 5.2.4](#).

For descriptions of the standard data presented in a CDT, see [Table 5-2](#).

- Click the  button to accept your changes and return to the main window.

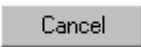
Click the  button to abort and return to the main window.

Table 5-2 Description of Standard Parameters in a CDT

Item	Function	Edit
Number (#)	<p>component number</p> <p>An index number that acts as an identification label when used in other menus/dialogs (e.g., Limit Alarms, Analog Outputs). Up to 20 components can be defined per data table.</p>	
Component	<p>names assigned to the various components displayed</p> <p>Components can be selected from the standard list, by pressing the F2 key (see Section 5.2.1), or entered by the user. Up to 15 characters can be used for the component name.</p>	✓
USR/STD	<p>whether the component data is standard or user-defined</p> <p>If the component was added by the Select Standard Component function (see Section 5.2.1) and no changes were made to the component data, STD displays. If the component was added manually by the user or modified, USR displays.</p>	
Detector ID	<p>component detector number</p>	✓
Retention Time	<p>time in seconds that apex of the component peak will appear</p> <p>Range = 0 to 6000 seconds</p>	✓
<div style="border: 2px solid black; background-color: yellow; padding: 5px; display: inline-block;"><b>CAUTION</b></div> <p><b>Ensure that the component retention times do not exceed the analysis time, as defined by the TEV Table (see Section 5.3). MON2000 does not automatically prevent the user from defining excessive component retention times.</b></p>		
Response Factor	<p>equal to the raw data of component peak divided by component concentration</p> <p>The maximum value is 1.0E+38.</p>	✓



Table 5-2 Description of Standard Parameters in a CDT (Continued)

Item	Function	Edit
Fixed/Variable	whether a component response factor is fixed or variable  A fixed response factor will not be updated during calibration.	✓
Calibration Concentration	component concentration in calibration gas  To enter a PPM, type "Xp"; e.g., "4.0p" will appear as "4.0 ppm". Values above 90 PPM are converted to percentages.	✓
Analysis Method	used to determine component raw data value  Use the pull-down menu to select either area, height, fixed, or the appropriate analog input (used with auxiliary analyzer).	✓
RT Percent Dev.	maximum acceptable percentage of deviation of the new retention time from the current retention time	✓
RT Secs. Dev.	maximum acceptable deviation time, in seconds, of the new retention time from the current retention time	✓
RT Update Method	determines when component retention time will be updated  Select Analysis to update after each run.  Select Calib to update only during final calibration run.	✓
Resp. Factor % Dev.	maximum acceptable percent deviation between the new response factor and the current response factor	✓
Total Concentration	total concentration of all components	

**CAUTION**

See Table 5-2 an asterisk (\*) in the column heading indicates a column that contains standard component values. If any of these values is modified, the corresponding component becomes non-standard (i.e., user-defined). It is not recommended that you edit a standard component value.

### 5.2.1 Select Standard Component(s)

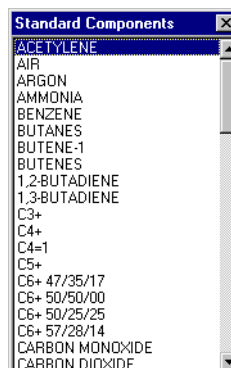
To select standard component(s) to be used by the displayed CDT,

1. Select the *Component* cell where you want the new component.
2. Click the **STD Comps (F2)...** button or press the F2 key to access the Standard Components menu.
3. The Standard Components menu appears.
4. Double-click the selected component to add it to the CDT. The component is automatically inserted into the selected table cell.

Click the **X** button or press the ESC key to abort and return to the Component Data Table dialog.

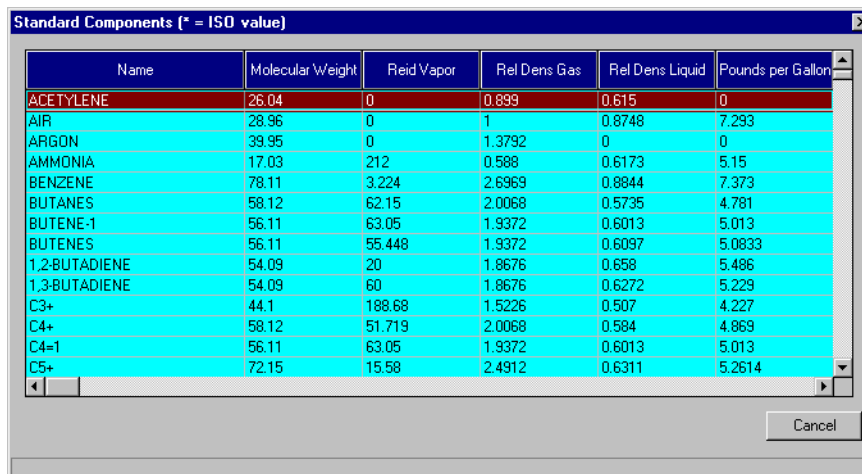
**NOTICE**

To add a new row to the CDT, click the last cell in the last row and press the ENTER key.



## 5.2.2 Select Standard Values

To read the values for the standard components, click the **Std Values (F3)...** button or press the F3 key to access the Standard Components dialog.



Name	Molecular Weight	Reid Vapor	Rel Dens Gas	Rel Dens Liquid	Pounds per Gallon
ACETYLENE	26.04	0	0.899	0.615	0
AIR	28.96	0	1	0.8748	7.293
ARGON	39.95	0	1.3792	0	0
AMMONIA	17.03	212	0.588	0.6173	5.15
BENZENE	78.11	3.224	2.8969	0.8844	7.373
BUTANES	58.12	62.15	2.0068	0.5735	4.781
BUTENE-1	56.11	63.05	1.9372	0.6013	5.013
BUTENES	56.11	55.448	1.9372	0.6097	5.0833
1,2-BUTADIENE	54.09	20	1.8676	0.658	5.486
1,3-BUTADIENE	54.09	60	1.8676	0.6272	5.229
C3+	44.1	188.68	1.5226	0.507	4.227
C4+	58.12	51.719	2.0068	0.584	4.869
C4=1	56.11	63.05	1.9372	0.6013	5.013
C5+	72.15	15.58	2.4912	0.6311	5.2614

Click the **Cancel** button to return to the CDT.

## 5.2.3 Update Standard Component(s)

### NOTICE

Typically, this function should only be performed when the MON2000 software is upgraded.

User-defined components are not affected by this update.

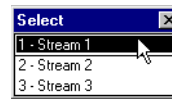
Click the **Update STD (F5)** or press the F5 key to upgrade the Standard Components list of this CDT to match the MON2000 Standard Component menu.

Note that this function updates the standard component list for the current CDT. MON2000 displays a confirmation dialog when a standard component is changed.

### 5.2.4 View Raw Data

To view the raw data for the displayed CDT,

1. Select the desired row from the currently displayed CDT.
2. Click the **Raw Data (F4)...** button or press the F4 key to access the Raw Data dialog.
3. The Stream Selection dialog appears. Double-click the desired stream or click the **X** button to exit. Only the streams associated with this CDT will display in the list menu.
4. The Raw Data dialog appears, listing the peak raw data from the last run of the stream represented by the CDT.



Ret Time	Peak Area	Peak Height	Det	Mthd
34.0	65744.0	1042.73	1	4
51.4	1.33+006	13953.9	1	4
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0
0.0	0.0	0.0	0	0

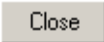
## NOTICE

When first displayed during a session, the Select Stream dialog highlights the stream that has the most recent raw data. Thereafter, the previously selected stream is highlighted.

5. The MON2000 operator can now copy the Retention Time from the Raw Data screen to the CDT as follows:
  - (a) Before pulling up the Raw Data screen, click Component #1 of the CDT.
  - (b) Click the Raw Data button or press the (F4) key to access the Raw Data screen.
  - (c) Press the **ENTER** key to copy the Retention Time (the next component's

RT is automatically targeted by MON2000). Then, press the **DOWN ARROW** key to advance to the next 'Raw Data' value.

(d) Repeat Step (c) until all Retention Times have been copied to the CDT.

6. Click the  button to clear the Raw Data screen.

Following is an example of a Raw Data Table.

*Table 5-3 Raw Data Table*


<b>Description</b>	<b>Method</b>
Baseline Resolved	1
Fused	2
Last of Fused Group	3
Tangent Skimmed	4
Resolved Rider Peak	5
Fused Rider	6
Last of Fused Rider	7
Tailing Peak	8
Forward Horizontal	20
Backward Horizontal	40
Baseline Forced at Valley	60
Inhibit On	100
Forced Integrate On	200
Forced Integrate End	300
Plateau Detect	400
Summation	500

## **NOTICE**

Some methods are a combination of the above types, e.g. 103 is **LAST OF FUSED GROUP (3)** and **INHIBIT ON (100)**.

### 5.2.5 Sort Retention Time

To sort the components listed in the displayed CDT by their retention times,

1. Click the  button or press the F6 key to access this function.
2. MON2000 automatically sorts the components.

## NOTICE

Sorting the CDT components by retention time may affect one or more of the following:

- Analog Outputs
- Averages
- Bargraphs
- Limit Alarms
- User Defined Calculations

## 5.3 TIMED EVENTS

Use this function to view and/or edit the GC Timed Events Tables (TEVs) assigned to and used by particular gas streams.

**Timed Events Description •**

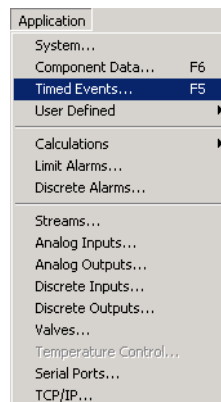
## NOTICE

See Section 6.6.2 for details about editing from the *Chromatogram > Chromatogram Viewer* menu.

- Analysis Time - Input total analysis time. LIMITS: 0.0 to 6000.0 seconds
- Cycle Time - Input total cycle time. LIMITS: 0.0 to 6000.0 seconds
- Off During Baseline (per sample valve) - toggle check boxes to select which valve(s) remain off during a baseline run

## NOTICE

MON2000 sorts components by the corresponding detector number first, then by the Retention Time.



## NOTICE

The Cycle Time must be at least 10 seconds greater than the Analysis Time.

**Valve Events**

- Type - use the pull-down menu to select between valve number (Valve #), discrete output channel number (DO #), and stream switch (Strm Sw); additional selections SSO1, SSO2, Bleed1, Bleed2, Block1 and Block2 are available for the Model 700 GC applications
- Valve/DO # (for valves and discrete outputs only) - input the valve number or discrete output channel number. Use the provided combo box to select valve number by name
- State (for all types except for stream switch) - use the pull-down menu to toggle ON\OFF
- Time - input the time that the event is to occur. LIMITS: 0.0 to 6000.0 seconds

**Integration Events**

- Type - use the pull-down menu to select between Inhibit, Integrate, Auto Zero, Slope Sensitivity, Peak Width, Single Baseline, FID Gain, Summation, or Fused Override
- Value - For peak width or slope sensitivity, input the number of points to be used. LIMITS: Peak Width and Slope Sensitivity, 1 to 99
- For FID gain, use the pull-down menu to toggle Low\High.
- For Single Baseline, use the pull-down menu to toggle OFF\BGN (Beginning)\END.
- Except for AutoZero, for all others use the pull-down menu to toggle ON\OFF. Auto Zero does not have 'Value' field.
- Det - enter the appropriate detector number that the event will effect. Valid range is '1' or '2'
- Time - input the time that the event is to occur. LIMITS: 0.0 to 6000.0 seconds

### Spectrum Gain Events

- Detector # - use the pull-down menu to select between detectors #1 and #2
- Gain - input the gain value for that detector. LIMITS: 0 to 24
- Time - input the time that the event is to occur. LIMITS: 0.0 to 6000.0 seconds

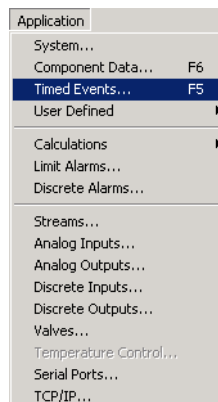
## NOTICE

See Section 6.6 for editing TEVs from CGM Viewer.

To access the Timed events feature,

1. Use the *Application > Timed Events* menu or press the F5 key to access this function.
2. The Timed Event Tables menu displays, listing the TEVs available per associated stream(s).

Table #	Associated Streams
1	1,2
2	3
3	
4	



Choose the desired TEV.


## NOTICE


The number of available TEVs depends on the GC unit configuration.

The standard GC application contains four TEVs. MON2000 can operate GC Applications with up to five TEVs.

To assign a TEV to a stream, use the Streams function (see Section 5.8).



3. Click the  button to accept your selection. The Timed Events Table dialog appears.

Click the  button to abort and MON2000 returns you to the main window.

**Timed Events Table 1**

Analysis Time: 225  
Cycle Time: 240

Sample Valves: 1 2 3 4 5  
Off During Baseline:

Valve Events:

	Type	Valve/DO #	State	Time
1	Valve #	2 - Valve 2	On	0.0
2	Valve #	3 - Valve 3	On	2.0
3	DO #	1 - Valve	On	5.0
4	Stim Sw			7.0
5	Valve #	1 - Valve	Off	10.0
6	DO #	2 - DO 2	Off	23.0
7	Valve #	3 - Valve 3	Off	42.0
8	Valve #	3 - Valve 3	On	142.0

Integration Events:

	Type	Value	Det	Time
1	Inhibit	On	1	0.0
2	Slope Sens	8	1	3.0
3	Peak Width	4	1	8.0
4	Inhibit	Off	1	26.0
5	Inhibit	On	1	36.0
6	Inhibit	Off	1	46.0
7	Inhibit	On	1	97.0
8	Peak Width	8	1	100.0
9	Inhibit	Off	1	101.0
10	Inhibit	On	1	139.0
11	Peak Width	3	1	143.0
12	Inhibit	Off	1	146.0
13	Inhibit	On	1	170.0
14	Peak Width	8	1	173.0
15	Inhibit	Off	1	174.0
16	Inhibit	On	1	223.0

Spectrum Gain Events:

	Detector #	Gain	Time
1	Detector 1	6	4.0
2	Detector 1	1	140.0
3	Detector 1	5	169.0

4. View or edit data.

## NOTICE



To add a new timed event, move the cursor to the last table cell (last row, last column) and press the ENTER key.

Integration Events:

1	Inhibit	ON	1	0.0	
2	Slope Sens		8	1	3.0
3	Peak Width		4	1	8.0
4	Inhibit	OFF		1	26.0
5	Inhibit	ON		1	36.0
6	Inhibit	OFF		1	46.0
7	Inhibit	ON		1	97.0
8	Peak Width		8	1	100.0
9	Inhibit	OFF		1	101.0
10	Inhibit	ON		1	139.0
11	Summation		3	1	143.0
12	Auto Zero	OFF		1	146.0
13	Slope Sens	ON		1	170.0
14	Peak Width		8	1	173.0
15	Inhibit	OFF		1	174.0
16	Inhibit	ON		1	223.0

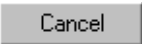
Use the check boxes to toggle the listed sample valves ON or OFF.

Double-click a given table cell or use one of the edit function buttons to make your changes. Some table cells will change into pull-down menus when selected. Choose your data from the pull-down menu provided.

5. To sort data based on time, click the  button for the corresponding table.
6. Click the  button to accept your changes and return to the main window.

## NOTICE

**If you configure duplicate TEVs (i.e., 2 or more TEVs contain the same parameter settings), an error dialog will display but your data will be saved.**

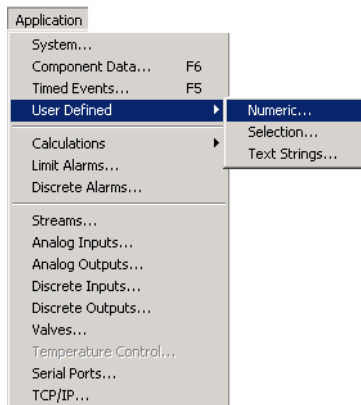
Click the  button to abort and return to the main window.

## 5.4 USER DEFINED

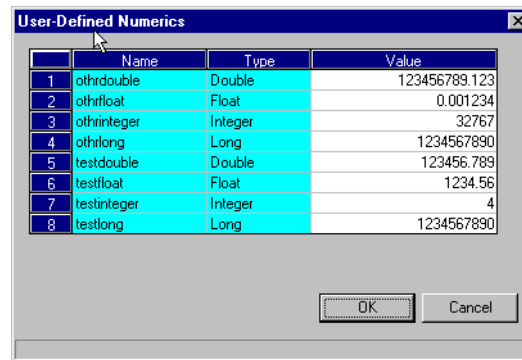
The user-defined functions allow you to edit a user-defined operator entry for an application-specific variable. These variables may be used in reports, calculations, and/or for controlling the GC operations; however, user-defined variables are not used by all applications.

### 5.4.1 Numeric

Use this function to edit values for defined initialized variables. The User Defined Numerics dialog defines the names, types, and values for all application-specific numeric variables.



1. Use the *Application > User Defined > Numerics* menu to access this function.
2. The User-Defined Numerics dialog appears.



Double-click the desired Value cell and type the new number.

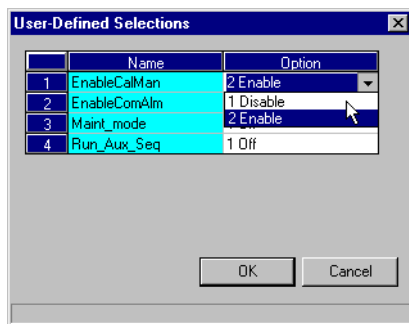
3. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.


## 5.4.2 Selection


Use this function to edit values for defined selection variables. The User Defined Selections dialog defines the names and values for all application-specific selection variables.

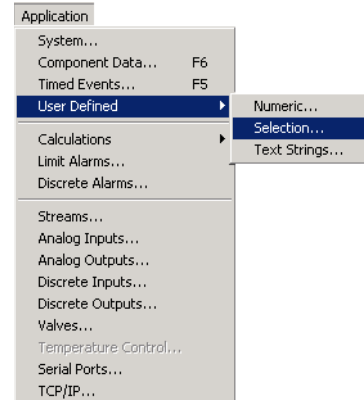
1. Use the *Application > User Defined > Selection* menu to access this function.
2. The User-Defined Selections dialog appears.



Double-click the desired Option cell and use the provided pull-down menu to select the new setting.

3. Click the  button to accept your changes and return to the main window.

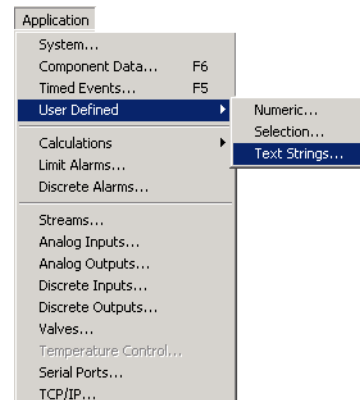
Click the  button to abort and return to the main window.



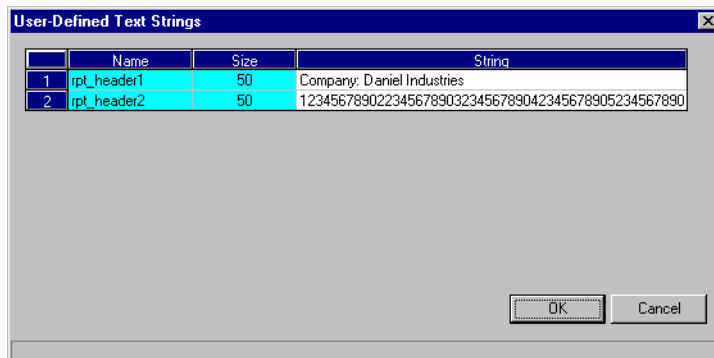
## 5.4.3 Text Strings

Use this function to edit text strings for defined string variables that may be used in reports. The User Defined Text Strings dialog defines the symbol name, size, and assigned text string for all application-specific text variables.

1. Use the *Application > User Defined > Text Strings* menu to access this function.




- The User-Defined Text Strings dialog appears.




## NOTICE

String length (i.e., how many characters you can enter) is limited to the number cited in the Size cell.

Double-click the desired String cell and type the new text.

- Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

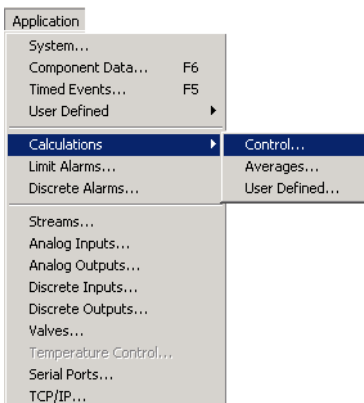
## 5.5 CALCULATIONS

These options allow you to activate and define how the output of standard or user-defined chromatograph analysis data is used in various calculations.

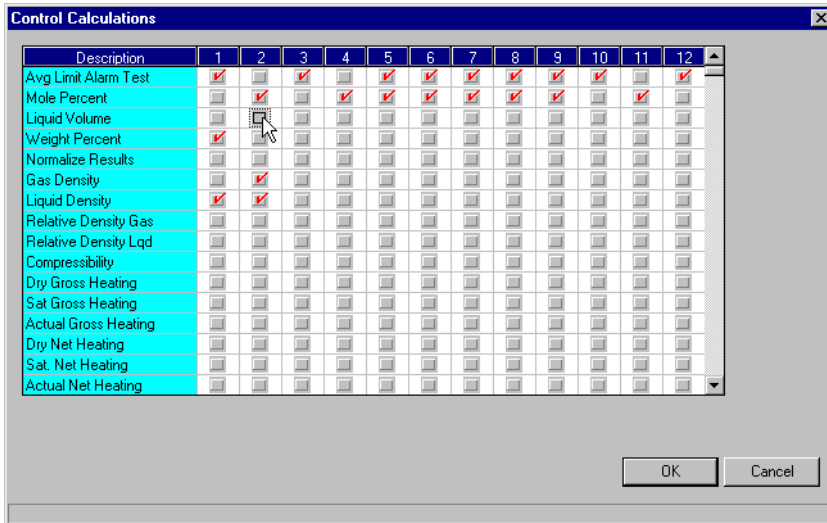
### 5.5.1 Control

Use this function to designate, by streams, the standard calculations (e.g., mole percent, liquid volume, gas density, Wobbe index, etc.) that should be performed from the GC analysis data. Calculations are enabled or disabled for each sample stream.

- Use the *Application > Calculations > Control* menu to access this function.

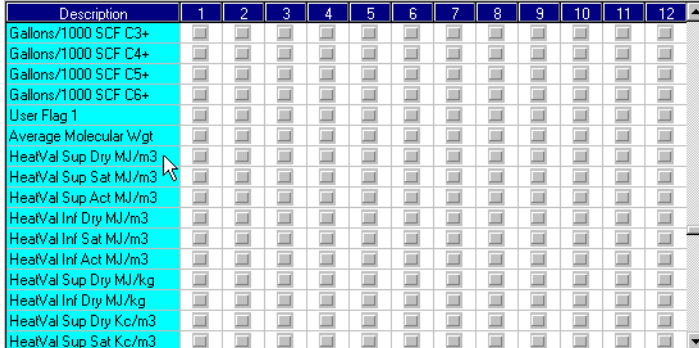


2. The Control Calculations dialog appears.



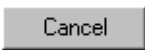
Click the check boxes to toggle a calculation ON or OFF for a given stream.

Scroll towards the end of the list to set metric calculations.



Before enabling a metric calculation, ensure that you also enable the Metric Base Conditions setting in the Systems dialog (see [Section 5.1](#)).

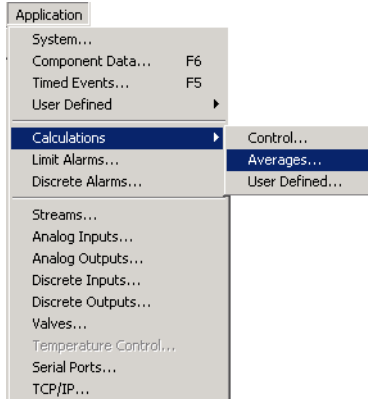
3. Click the  button to accept your selections and return to the main window.

Click the  button to abort and return to the main window.

## NOTICE

You can use the arrow keys to move from one Stream cell to another, and press the space bar to toggle the calculation.

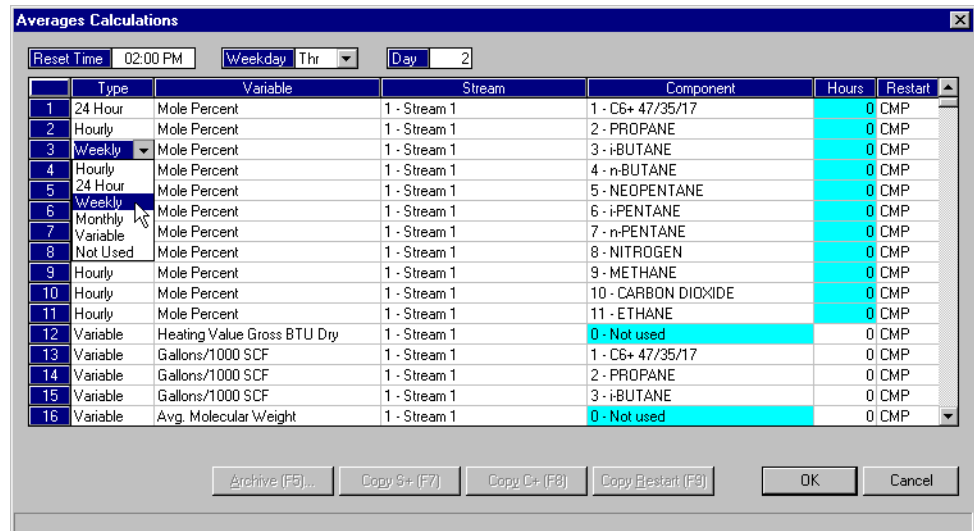
## 5.5.2 Averages



Use this function to designate, by streams and components, averages of standard calculations MON2000 should perform.

1. Use the *Application > Calculations > Averages* menu to access this function.
2. The Averages Calculations dialog appears.

Double-click the desired cell and either type the new data or use the provided pull-down menu to select the new setting.



When changing the reset time, note the following:

Average	Setting Used
Hourly	Reset Time
24-Hour	Day, Reset Time
Weekly	Weekday
Monthly	Day, Reset Time


To set a custom time interval per calculation, set the *Type* to Variable and enter the desired interval length in the *Hours* cell. A setting of “0” means an average calculation will be performed for each analysis run of that stream.

## NOTICE

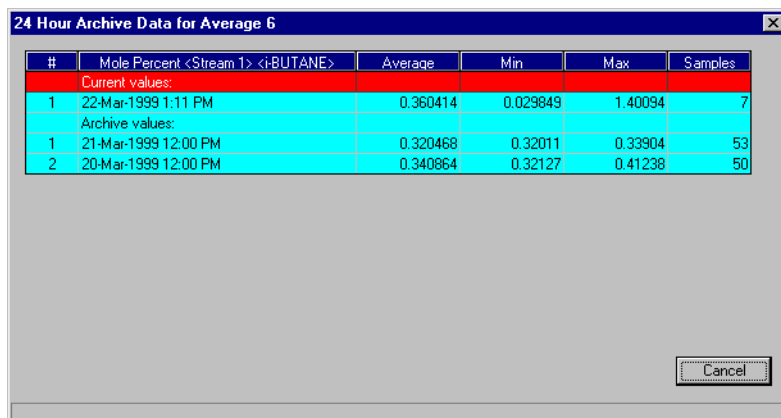
Any GC analysis variable with defined alarm limits cannot be averaged or archived while in an active alarm state (see [Section 5.6](#) for more information on Limit Alarms).

To disable this feature, use the Control Calculations function to set Avg Limit Alarm Test to OFF (see [Section 5.5.1](#)).

Note that this custom Hours setting overrides the Reset Time setting.

- Use the provided pull-down menu to add a new variable to the list.
- To view an archive of averages for a given variable, select the desired variable and click the  button or press the F5 key.

The Archive Data dialog for that variable appears.



#	Mole Percent <Stream 1> <i>t</i>BUTANE	Average	Min	Max	Samples
Current values:					
1	22-Mar-1999 1:11 PM	0.360414	0.029849	1.40094	7
Archive values:					
1	21-Mar-1999 12:00 PM	0.320468	0.32011	0.33904	53
2	20-Mar-1999 12:00 PM	0.340864	0.32127	0.41238	50



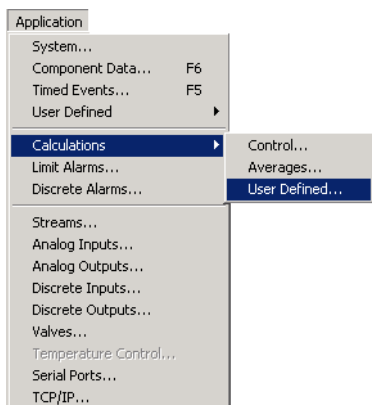
## NOTICE

An error message displays when the last available stream or component is reached.

To save this archive to disk, right-click the archive table and select the Save Sheet option from the pop-up menu.

5. To copy the stream settings from a highlighted row and apply them to the next row, click the **Copy S+ (F7)** button or press the F7 key. This feature also increments the *Stream* value to the next available stream (e.g., incrementing from Stream 2 to Stream 8), per the GC application.
6. To copy the component settings from a highlighted row and apply them to the next row, click the **Copy C+ (F8)** button or press the F8 key. This feature also increments the *Component* value to the next available component (e.g., incrementing from “Ammonia” to “Benzene”), per the GC application.
7. To copy the *Restart* setting from a highlighted row and apply it to the next row, click the **Copy Restart (F9)** button or press the F9 key.
8. Click the **OK** button to accept your selections and return to the main window.

Click the **Cancel** button to abort and return to the main window.

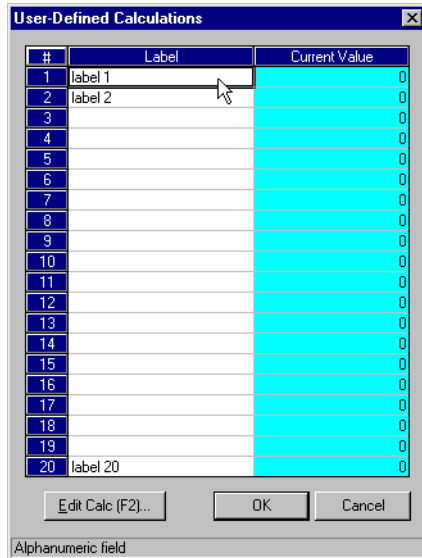


### 5.5.3 User Defined

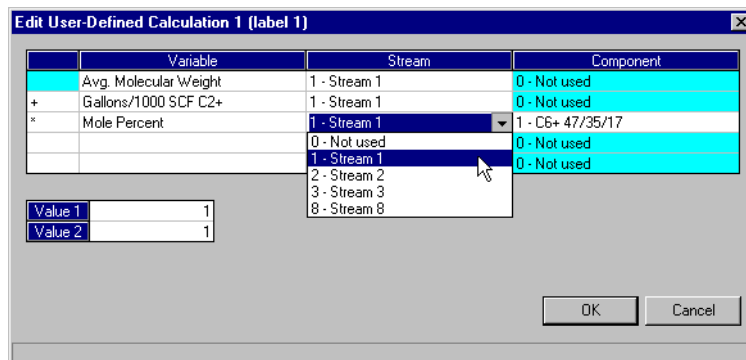
Use this function to create and edit customized calculations on GC analysis data. MON2000 will allow up to 20 user-defined calculations.

1. Use the *Application > Calculations > User Defined* menu to access this function.

2. The User-Defined Calculations dialog appears.



3. Click the calculation name you wish to edit, or click in the next available blank Label cell. The Label field accepts 15 characters.
4. Click the **Edit Calc (F2)...** button to edit or create the calculation function. The Edit User-Defined Calculation dialog appears.



## NOTICE

Your user-defined calculation becomes a variable that can be used when:

- calculating averages
- assigning alarm limits
- calculating analog outputs
- generating bargraphs and reports
- creating other user-defined calculations

**NOTICE**


The calculation completes each step from top to bottom.

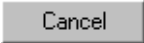
- (a) To change the calculation function, click the appropriate cell and use the pull-down menu to choose the desired operator.


To change or add a variable name, use the Variables pull-down menu.

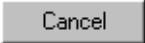
To select a stream or component, click the appropriate cell and use the pull-down menu to choose the desired stream/component.

Enter any constant values in the Value 1 and Value 2 cells.

- (b) Click the  button to accept your changes and return to the User-Defined Calculation dialog.

Click the  button to abort and return to the User-Defined Calculation dialog.

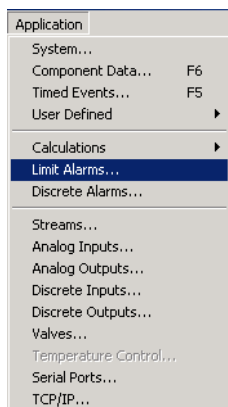
5. Click the  button to accept your new or edited calculation and return to the main window.

Click the  button to abort and return to the main window.

## 5.6 LIMIT ALARMS

Use this function to set threshold limits for GC analysis data. When a limit is exceeded, an alarm is activated and logged. [See Section 8.3](#) for information on Alarm Logs.

Note that Modbus Registers assigned to alarms are application-specific.



1. Use the *Application > Limit Alarms* menu to access this function.
2. The Limit Alarms dialog appears.

#	Variable	Stream	Component	Discrete Output	Type
1	Mole Percent	1 - Stream 1	1 - C6+ 47/35/17	1 - DO 1	High
2	Mole Percent	2 - Stream 2	11 - ETHANE	1 - DO 1	High
3	Mole Percent	3 - Stream 3	11 - ?	1 - DO 1	High
4	Mole Percent	2 - Stream 2	3 - i-BUTANE	1 - DO 1	High
5	Mole Percent	0 - Not used	4 - n-BUTANE	1 - DO 1	High
6	Mole Percent	1 - Stream 1	5 - NEOPENTANE	1 - DO 1	High
7	Mole Percent	2 - Stream 2	6 - i-PENTANE	1 - DO 1	High
8	Mole Percent	3 - Stream 3	7 - n-PENTANE	1 - DO 1	High
9	Mole Percent	8 - Stream 8	8 - NITROGEN	1 - DO 1	High
10	Mole Percent	8 - Stream 8	9 - METHANE	1 - DO 1	High
11	Mole Percent	8 - Stream 8	10 - CARBON DIOXIDE	1 - DO 1	High
12	Mole Percent	8 - Stream 8	11 - ETHANE	1 - DO 1	High
13		0 - Not used	0 - Not used	0 - Not used	All
14		0 - Not used	0 - Not used	0 - Not used	All
15		0 - Not used	0 - Not used	0 - Not used	All
16		0 - Not used	0 - Not used	0 - Not used	All

3. To change the assigned variable, stream or component, click the appropriate cell and use the provided pull-down menu.

Note that you must first select a variable before entering the related data.

4. To assign the discrete hardware output that will be set when the alarm is active, click in the appropriate cell and use the provided pull-down menu.

Output values range from “1” to “N”, per the discrete hardware output identification number and the GC application. A discrete

## NOTICE

**You can add a new variable only if an available row is blank. The number of allowed limit alarms is fixed by the GC application.**

output of “0 - Not used” indicates that no output is set.

## NOTICE

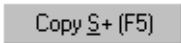
**A discrete output can be used to monitor one or more inputs.**

**If you are using discrete outputs to reflect the status of discrete inputs, ensure that the output assignments set here coordinate with those set in the Discrete Alarms dialog (see Section 5.7).**

To set discrete outputs, see Section 5.12.

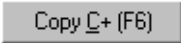

- To change the alarm type, click the appropriate cell and use the provided pull-down menu.

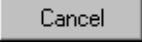
Type	Purpose
All	use all 4 limits (both Low and both High)
High	use only High and High-High limits
Low	use only Low and Low-Low limits

- Input the desired high/low limits in the appropriate cells.
- To copy the stream settings from a highlighted row and apply them to the next row, click the  button or press the F5 key. This feature increments the Stream value to the next available stream (e.g., incrementing from “Stream 2” to “Stream 8”), per the GC application.

## NOTICE

**An error message displays when the last available stream or component is reached.**

8. To copy the component settings from a highlighted row and apply them to the next row, click the  button or press the F6 key. This feature increments the Component value to the next available component (e.g., incrementing from “Ammonia” to “Benzene”), per the GC application.
9. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

#### **Limit Alarms Description**

- Variable - selected variable assigned to the limit alarm
- Stream - stream number assigned to the variable or the channel number if an analog input or analog output
- Component - component name and number assigned to the variable
- Discrete Output - number of the discrete hardware output that will be set when the alarm is active; zero indicates no discrete output will be set

- Type - High uses only the high and the high-high limits, Low uses only the low and the low-low limits, and All uses both low and both high limits

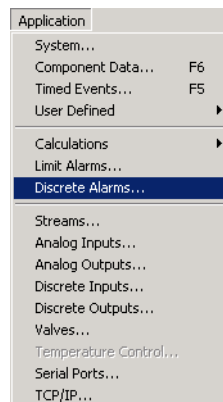
Type	Purpose
Low-Low	If the variable value falls below this limit, the low-low limit alarm is activated. This alarm is for extreme situations
Low	If the variable value falls below this limit, the low limit alarm is activated.
High	If the variable value rises above this limit, the high limit alarm is activated.
High-High	If the variable value rises above this limit, the high-high limit alarm is activated. This alarm is for extreme situations.

## 5.7 DISCRETE ALARMS

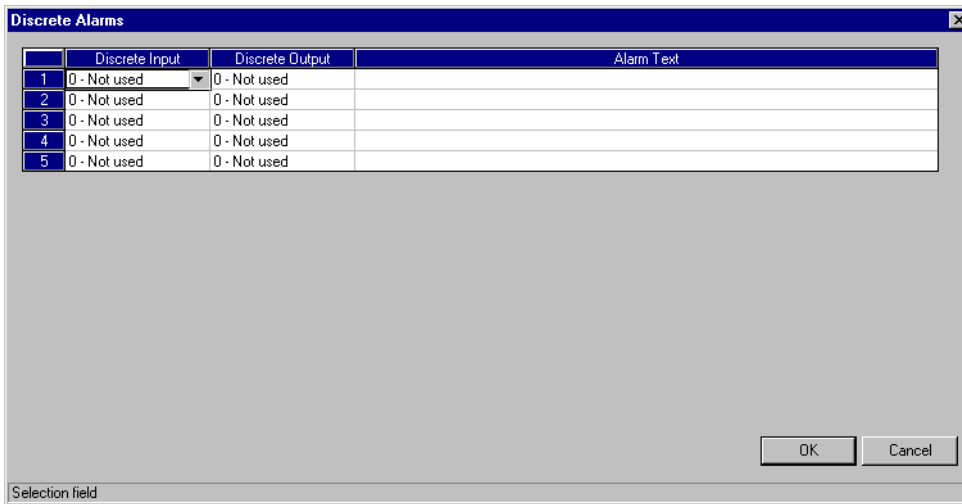
Use this function to assign discrete hardware inputs, used to set alarms, to one of the available discrete hardware outputs.

For more information on discrete outputs, see [Section 5.12](#).

1. Use the *Application > Discrete Alarms* menu to access this function.



- The Discrete Alarms dialog appears.



- Use the provided Discrete Input pull-down menu to select the identification number of the discrete hardware input to be used for alarm purposes.

Input values can range from “1” to “N”, per the discrete hardware output identification number and the GC application. A discrete input of “0 - Not used” indicates that no input has been assigned.

To configure discrete inputs, see [Section 5.11](#).

- Use the provided Discrete Output pull-down menu to select the identification number of

## NOTICE

All alarms from digital inputs with assignments other than “0” are recorded in the Alarm Log.



the discrete hardware output to be used for alarm purposes.

## NOTICE

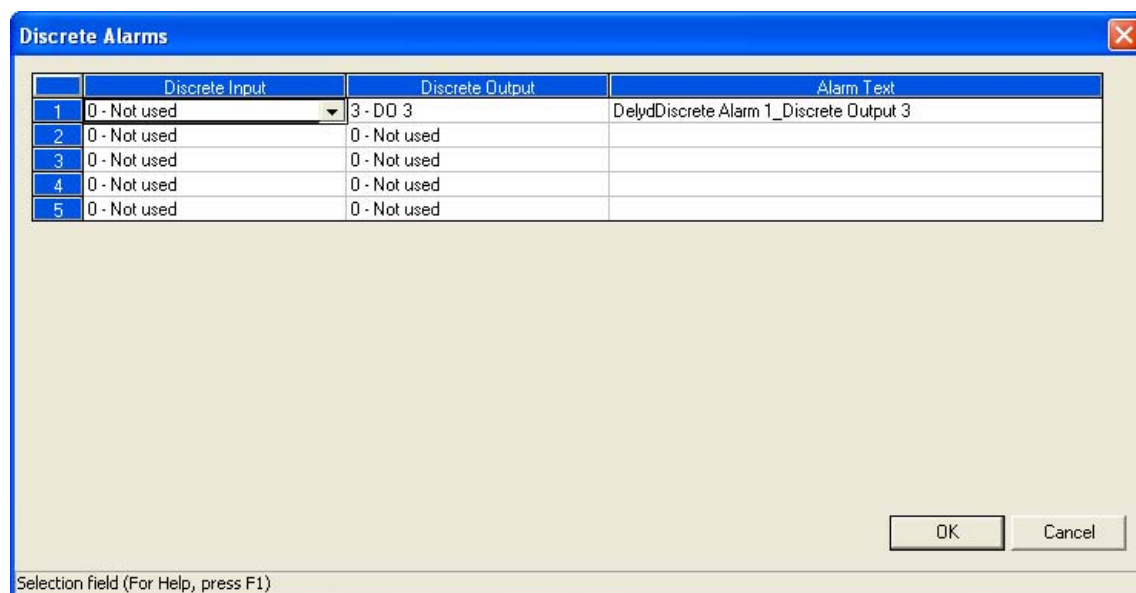
**A discrete output can be used to monitor one or more inputs.**

**If you are using discrete outputs to reflect the status of GC analysis data alarms, ensure that the output assignments set here coordinate with those set in the Limit Alarms dialog (see Section 5.6).**

Output values can range from “1” to “N”, per the discrete hardware output identification number and the GC application. A discrete output of “0 - Not used” indicates that no output has been assigned. To configure discrete outputs, see Section 5.12.

### 5.7.1 Delayed Discrete Alarms

*A delayed discrete alarm* can be set to trigger a discrete alarm and activate the appropriate discrete output if a previously specified discrete input has been closed for a user-defined amount of time.



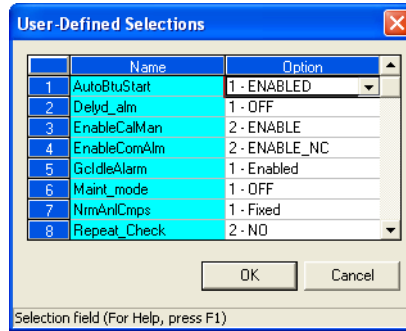
For example, if discrete input #1 is closed for 60 seconds, discrete alarm #1 will be activated, which will in turn activate discrete output #3. MON2000 will display an active alarm in the bottom row of the GC column of the GC Status Bar. MON2000 will also copy the alarm description in the *Alarm Text* column to the appropriate Alarm screens.

The delayed discrete alarm feature is only available with the following apps installed:

- 700\_Mode0\_v192 or later;
- 700\_DewUS\_v184 or later;
- 700\_Mode1\_v193 or later;
- 2350A\_Mode0\_v183 or later;
- 2350A\_Mode1\_v184 or later.

To set up a discrete alarm, do the following:

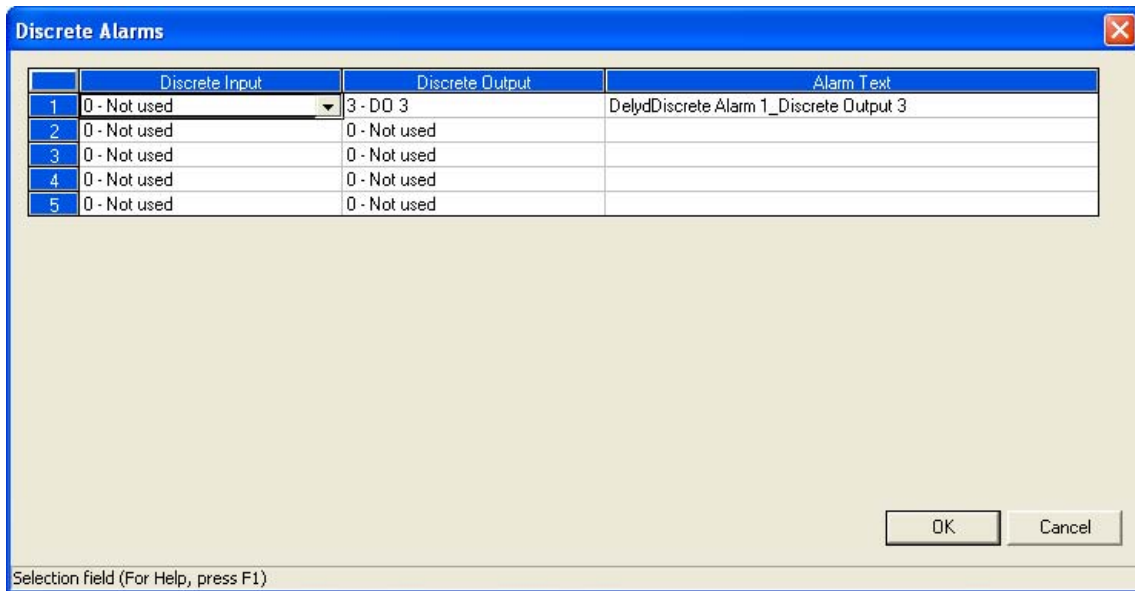
1. Select *Applications > User Defined > Selection....* The User-Defined Selections window displays.



2. Locate the **Delyd\_alm** variable under the *Name* column and set its *Option* to ON and click OK.

Note that setting the *Option* to OFF disables the delayed discrete alarm feature.

3. Select *Applications > Discrete Alarms....* The Discrete Alarms window displays.



4. For the appropriate alarm, select the discrete output that should be activated if the associated discrete input is closed.

By default, discrete outputs #1, #2, and #3 can be selected.

To make discrete output #4 available for selection, do the following:

- (a) Select *Applications > User Defined > Selection....* The User-Defined Selections window displays.
- (b) Set EnableComAlarm to **Disable**.
- (c) Select *Applications > Discrete Outputs....* The Discrete Outputs window displays.
- (d) Set the Switch field for discrete output #4 to **Auto**.

To make discrete output #5 available for selection, do the following:

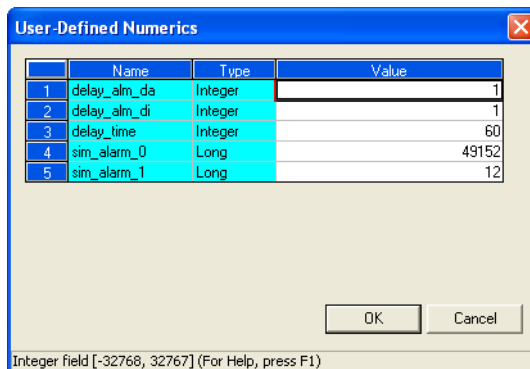
- (a) Select *Applications > User Defined > Selection....* The User-Defined Selections window displays.
- (b) Set EnableCalMan to **Disable**.
- (c) Select *Applications > Discrete Outputs....* The Discrete Outputs window displays.
- (d) Set the Switch field for discrete output #5 to **Auto**.

## NOTICE

All discrete inputs should be set to "0 - Not used".

5. Enter the appropriate alarm text in the *Alarm Text* column, if desired. This text will be copied to the appropriate alarm screens if the discrete alarm is triggered.
6. Click **OK** to accept your changes.

7. Select *Applications > User Defined > Numeric...* The User-Defined Numerics window displays.



8. The following variables apply to the delayed discrete alarm:
  - **delay\_alm\_da**: Defines which discrete alarm will be activated.
  - **delay\_alm\_di**: Defines which discrete input will be used to initiate the delayed discrete alarm.

## NOTICE

Although there are five discrete inputs available, closing Discrete Input #4 will result in an active *Analyzer Failure* alarm that will cause the GC to go to idle if Discrete Input #4 remains closed up to the end of the current analysis.

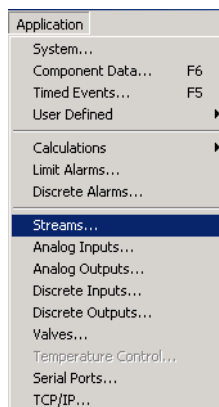
Discrete Input #5 can be used if the *run\_Aux\_Seq* option in the 'User-Defined Selections window is set to OFF.

- **delay\_time**: Defines the time, in seconds, between the moment the discrete input is closed and the delayed discrete alarm is activated. Range is 0 to 500 seconds. Default value is 60 seconds.

## 5.8 STREAMS

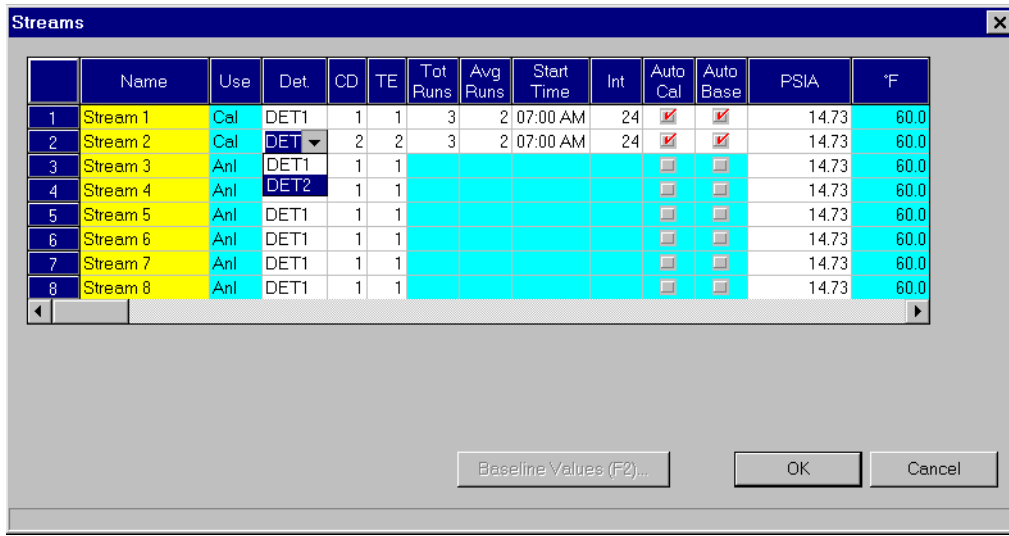
This function allows you to:

- assign CDTs and TEVs to a particular stream
- designate a stream for analysis or calibration (or none)
- control automatic calibration parameters, such as the total number of runs, runs to be averaged, starting times, and time between automatic calibrations and baseline runs
- define baseline pressure and temperature conditions that are applicable to calculated GC analysis data, such as compressibility



To use the Streams function,

1. Use the *Application > Streams* menu to access this function.
2. The Streams dialog appears.



3. To edit the settings displayed, click the appropriate cell, use the provided pull-down menus, or to choose the check boxes to enable or disable the automatic calibration and baseline calibration.

See the following tables for details.

The **standard settings** include:

*Table 5-4 Description of Standard Stream Settings*

<b>Std Setting</b>	<b>Description</b>
<Number>	<p>number label assigned by MON2000</p> <p>This number correlates with the stream switch. A maximum of 12 streams can be controlled by MON2000 and a standard GC application.</p>
Name	text string label to identify a stream (12 character maximum)
Use	<p>how stream is used</p> <p>Settings include: calibration (CAL); analysis (ANL); not used (NOT)</p>
Det	<p>detector used by this stream</p> <p>Control of the detector is application-specific. For example,</p> <ul style="list-style-type: none"> <li>• for Model 700/2350A, Modes 0 and 1, the Det col is “DET1” and read-only</li> <li>• for Model 700/2350A, Mode 2, the Det col is editable</li> <li>• for Model 700/2350A, Mode 3, the Det col is “DUAL” and read-only</li> </ul>
CD	CDT associated with this stream ( <a href="#">see Section 5.2</a> )
CD2	CDT 2 For the Model 700/2350A Modes 2 and 3, an additional CD column displays.
TE	TEV associated with this stream ( <a href="#">see Section 5.3</a> )
TE2	TEV 2 For the Model 700/2350A Modes 2 and 3, an additional TE column displays.



For **calibration (CAL) streams**, you can edit the following control parameters:

*Table 5-5 Description of Calibration Stream Settings*

<b>Cal Setting</b>	<b>Description</b>
Tot	number of runs made for each calibration  Range: 1 to 10
Avg	number of last calibration runs to average  E.g., if 5 calibration runs are performed and <i>Avg</i> is set to “3”, then the last 3 runs are used to average the calibration results.
Start	time the first automatic calibration is to be performed
Int	number of hours between automatic calibrations

Table 5-5 Description of Calibration Stream Settings (Continued)

Cal Setting	Description
Auto Cal	enable/disable the automatic calibration
Auto Base	and baseline run (first check box sets the automatic calibration; second check box sets the baseline run)

**NOTICE**

**For the automatic calibration to work, at least one stream switch (valve event Strm Sw) must be included in the corresponding TEV (see Section 5.3).**

If the automatic baseline run is enabled, the GC performs an additional calibration run (before the calibration runs to be averaged) without the calibration gas. This run evaluates peaks caused by the GC valve action alone; any peak areas found are subtracted from the subsequent analyses. To view or print the baseline run results, see Step 4.

**NOTICE**

**Disabling the Auto Base setting will delete existing CDT baseline data for the associated stream.**

You can edit the following parameters for a defined stream used in **GC calculations**. These parameters are also used for post-analysis calculations that use stream-specific base pressure and temperature values. Note that these parameters are not applicable for every application.

Table 5-6 Description of GC Calculation Parameters

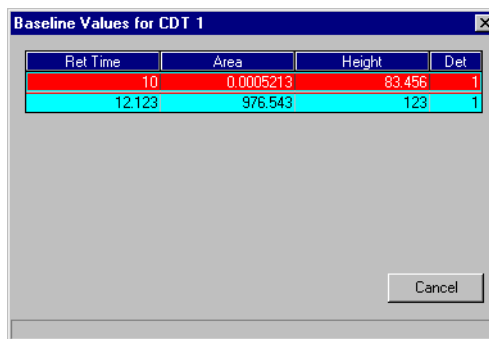
Par Setting	Description
PSIA BAR	base temperature in PSIA or bar units
<div style="background-color: blue; color: white; padding: 5px; display: inline-block;"><b>NOTICE</b></div> <p><b>To change the displayed system units, see Section 5.1 for details.</b></p>	
deg F deg C	base temperature in degrees Fahrenheit or Celsius
Opt Pres 1 Opt Pres 2 Opt Pres 3	If compressibility is activated for a particular stream (Calculation Control function, (see Section 5.5.1), up to 3 optional pressures can be defined to calculate additional post-analysis data.

Only the base pressure can be edited. The base temperature is a constant 6 °F (15 °C) for all calculations.

**NOTICE**

If a stream is not used, you cannot access baseline data for that stream.

4. To view or print the baseline run results, click the  button or press the F2 key. The Baseline Values dialog appears.



5. Click the  button to return to the main window.

## 5.9 ANALOG INPUTS

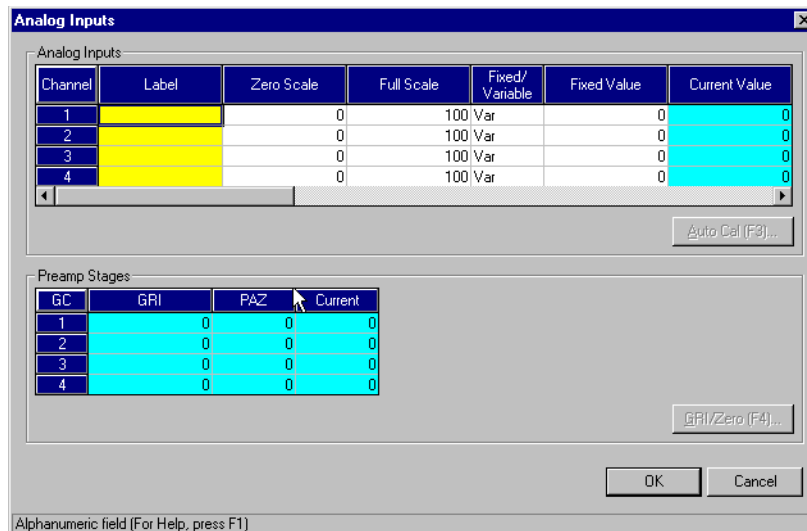
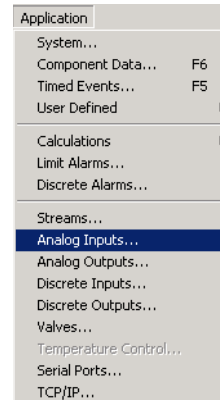
This function allows you to:

- assign identifying labels
- assign scale ranges
- calibrate analog inputs for zero and full scale values

Electrical current signals ranging from 4 to 20mA ( $\pm 10\%$ ) are accepted as analog inputs.

To use the Analog Inputs function,

1. Use the *Application > Analog Inputs* menu to access this function.
2. The Analog Inputs dialog appears.



To edit the settings displayed, click the appropriate cell or click and use the provided pull-down menus.

### NOTICE

The 2350A GC Controller and the Model 700 unit supports up to four AI channels.

See the following table for details or refer to Step 3 for a more automated process.

Table 5-7 Description of Analog Input Settings

Setting	Description
Channel	channel number assigned  Number of available analog inputs is dependent upon the GC Controller model.
Label	name used to identify the analog input (12 characters maximum)
Zero Scale	value used as the zero scale when converting the analog input value
Full Scale	value used as the full scale when converting the analog input value
Fixed/Variable	analog input operation mode  FXD = fixed VAR = variable  If the operation mode is fixed, the analog input is set to the number entered for the Fixed Value.
Fixed Value	analog input value used during fixed operation
Current Value	current readout values of the analog inputs (values reflect scale assignments)
GC GRI PAZ	Gain Ratio Index (GRI) and Preamp Zero (PAZ) readouts from the GC preamplifier's 4 stages; use as a troubleshooting aid  Normal preamp stage (gain) operating ranges for Models 500, 700 and 1000 GC units are shown in <a href="#">Table 5-8</a> below.
Zero Scale Calib Adjustment mA	calibrated analog inputs for known zero scale electrical current levels

## NOTICE

**MON2000 accepts a Zero Scale calibration value that is higher than the Full Scale value.**

**A higher Zero Scale value can be useful in applications that require an inverse display, or record of analog signal levels.**

Table 5-7 Description of Analog Input Settings (Continued)

Setting	Description
Full Scale Calib Adjustment mA	calibrated analog inputs for known full scale electrical current levels

Table 5-8 Gain Operating Ranges for Models 500, 700 and 1000 GCs

GC	GRI	PAZ (12-bit AD)	Value (12-bit AD)	PAZ (16-bit AD)	Value (16-bit AD)
1	0.0 to 0.0	600 to 800	0 to 4095	4800 to 6400	-32767 to 32767
2	0.8 to 1.1	600 to 800	0 to 4095	4800 to 6400	-32767 to 32767
3	0.8 to 1.1	600 to 800	0 to 4095	4800 to 6400	-32767 to 32767
4	0.8 to 1.1	1150 to 1500	0 to 4095	9200 to 12000	-32767 to 32767

3. To perform an automated input calibration,
  - (a) Select the desired channel by clicking anywhere in that row.
  - (b) Set the analog input signal to either its minimum level or the anticipated Zero Value.

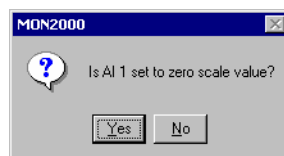
## NOTICE

**This step may require adjusting a rheostat, or another controlling device, at the source of the analog input signal.**

- (c) Set the anticipated Full Value.
- (d) Click the  button or press the F3 key.

You can abort this process at any time by clicking the  button.

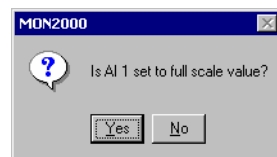
- The Zero Scale Adjustment dialog appears.



Click the  button to continue.

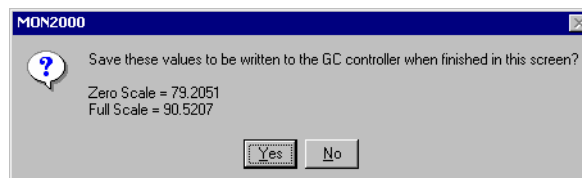
MON2000 accepts a Zero Scale calibration value that is higher than the Full Scale value. A higher Zero Scale value can be useful in the applications that require an inverse display, or record, of analog signal levels. 2350A GC Controllers and Model 700 units support up to 4 Analog channels.

- The Full Scale Adjustment dialog appears. Adjust the Analog Input to its Full Scale value.



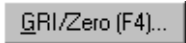
Click the  button to continue.

- MON2000 verifies that the recorded values are acceptable. A confirmation dialog displays.




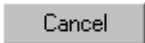
Click the  button to accept your changes.

Click the  button to cancel and return to the Analog Input dialog.

7. To perform a GRI (Gain Ratio Index) calculation, click the  button or press the F4 key.

A GRI calculation confirms the GC Controller preamp operation. It can be performed after a preamp calibration has been completed, or as a trouble shooting procedure.

8. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

## NOTICE

Ensure that you halt any ongoing analysis runs (see Section 4.3) before performing a GRI calculation.

## 5.10 ANALOG OUTPUTS

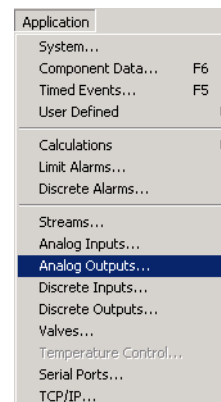
This function allows you to:

- assign variables to Analog Outputs
- assign scale ranges
- calibrate analog outputs for zero and full scale values

### 5.10.1 Analog Output Dialog Description

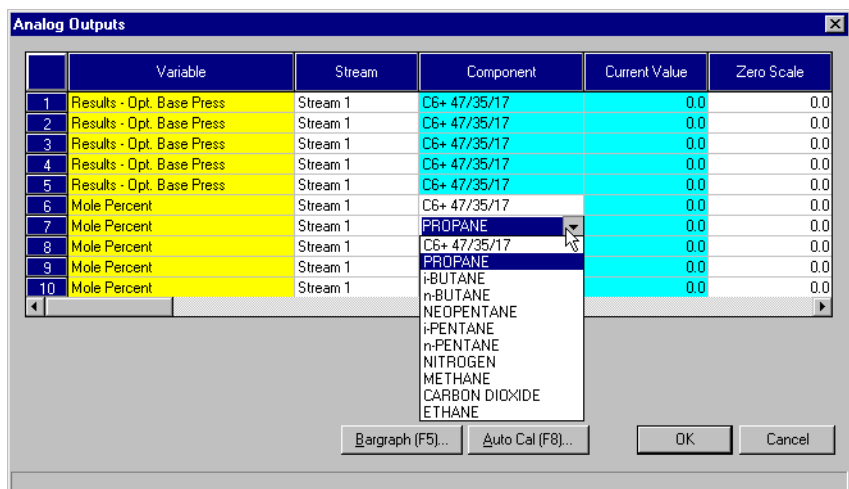
To use the Analog Outputs function,

1. Use the *Application > Analog Outputs* menu to access this function.





2. The Analog Outputs dialog appears.



To edit the settings displayed, double-click the appropriate cell or click and use the provided pull-down menus.

## NOTICE

**When assigning analog outputs, first check the CGM Analog Output Config field in the System dialog (see Section 5.1).**

**An analog output assignment that uses the same analog output number as the CGM setting will produce erratic CGM trace output, possibly with incorrect scaling.**

See the following table for details.

*Table 5-9 Description of Analog Output Settings*


Setting	Description
<Number>	number assigned to Analog Output  Number of available analog outputs is dependent upon the GC Controller model.
<div style="background-color: #0070C0; color: white; padding: 5px; display: inline-block;"><b>NOTICE</b></div> <p><b>If the GC unit includes a Daniel Analog Expansion Module (AEM), P/N 1-0500-001, reserve analog output number 1 (first row) for the variable Bargraph.</b></p>	
Variable	type of GC analysis data on which to base signal level of analog output
Stream	stream number assigned to the variable or the channel number if referencing an analog output
Component	name of component monitored by this output
Current Value	current readout values of the analog output (values reflect scale assignments)
Zero Scale	value used to represent the minimum value (4mA) when scaling the analog output value
Full Scale	value used to represent the maximum value (20mA) when scaling the analog output value
Fixed/Var	analog output operation mode  Fixed = fixed Var = variable  If the operation mode is fixed, the analog output is set to the number entered for the Fixed Value.


*Table 5-9 Description of Analog Output Settings (Continued)*

Setting	Description
Fixed Value	analog output value used during fixed operation
Zero Adjustment	value used to correct Zero Scale
Full Adjustment	value used to correct Full Scale

**NOTICE**

When defining a new analog output, perform a calibration first to obtain accurate Zero and Full Adjustment values (see [Section 5.10.4](#) or [Section 5.10.5](#)).

3. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

### 5.10.2 Changing a Variable

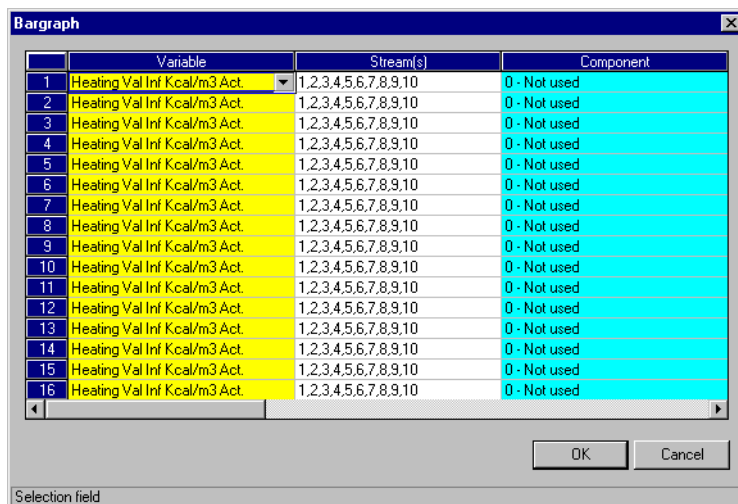
To change a variable assignment, click the appropriate Variable cell. Use the provided pull-down menu and click the desired variable to select it.

### 5.10.3 Changing the Bargraph

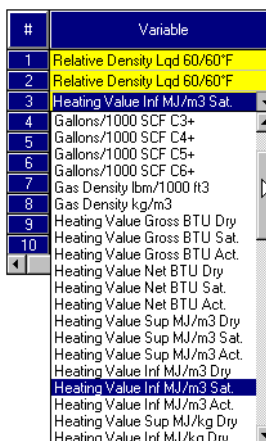
Use this function to designate which AEM output analog signals can be used to drive the bargraph device inputs. Each of the 16 available AEM output signals can be assigned to represent various GC analysis data variables.

To edit the variables and corresponding settings displayed by the bargraph,

1. Click the **Bargraph (F5)...** button or press the F5 key.
2. The Bargraph dialog appears.



To edit the settings displayed, double-click the appropriate cell or click and use the provided pull-down menus. See [Section 5.10.1](#) for more details.



## NOTICE

Multiple streams can be entered by separating the stream numbers with commas (e.g., 2,3). Bargraph results will be produced for each stream.

#	Variable
1	Relative Density Lqd 60/60°F
2	Relative Density Lqd 60/60°F
3	Heating Value Inf MJ/m <sup>3</sup> Sat.
4	Gallons/1000 SCF C3+
5	Gallons/1000 SCF C4+
6	Gallons/1000 SCF C5+
7	Gallons/1000 SCF C6+
8	Gas Density lbm/1000 ft <sup>3</sup>
9	Heating Value Gross BTU Dry
10	Heating Value Gross BTU Sat.
	Heating Value Gross BTU Act.
	Heating Value Net BTU Dry
	Heating Value Net BTU Sat.
	Heating Value Net BTU Act.
	Heating Value Sup MJ/m <sup>3</sup> Dry
	Heating Value Sup MJ/m <sup>3</sup> Sat.
	Heating Value Sup MJ/m <sup>3</sup> Act.
	Heating Value Inf MJ/m <sup>3</sup> Dry
	Heating Value Inf MJ/m <sup>3</sup> Sat.
	Heating Value Inf MJ/m <sup>3</sup> Act.
	Heating Value Sup MJ/kg Dry
	Heating Value Inf MJ/kg Dry

- To change a variable assignment, click the appropriate Variable cell. Use the provided pull-down menu and click the desired variable to select it.
- Click the  button to accept your changes and return to the Analog Outputs dialog.

Click the  button to abort and return to the Analog Outputs dialog.

#### 5.10.4 Performing a Manual Calibration

To manually calibrate an analog output,



- Select the desired analog output by clicking anywhere in the corresponding row.
- Set the *Zero Scale* and *Full Scale* values as desired.
- Set the *Fixed/Var* parameter to “Fixed”.
- Set *Fixed Value* equal to the Zero Scale value.
- Set *Zero Adjustment* and *Full Adjustment* to “0.0”.
- Click the  button to accept your changes and exit from the Analog Outputs dialog.
- Return to the Analog Outputs dialog. Wait until the *Current Value* of the analog output is equal to the Zero Scale value (see Step 2).
- Record the value, in engineering units, read by the receiving device (e.g., a voltmeter).
- Set *Fixed Value* equal to the Full Scale value (see Step 2).

### NOTICE

Setting both adjustment values to “0.0” disables the scale adjustment.

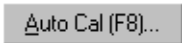
See Appendix D for an alternative calibration method for analog outputs.

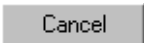
Appendix D includes an example of calibrating an output scale of 0 to 1200.

10. Click the  button to accept your changes and exit from the Analog Outputs dialog.
11. Return to the Analog Outputs dialog. Wait until the *Current Value* of the analog output is equal to the Full Scale value (see [Step 2](#)).
12. Record the value, in engineering units, read by the receiving device (e.g., a voltmeter).
13. Set *Zero Adjustment* to the value recorded in [Step 8](#).
14. Set *Full Adjustment* to the value recorded in [Step 12](#).
15. Set the *Fixed/Var* parameter to “Var”.
16. Click the  button to complete the calibration and return to the main window.

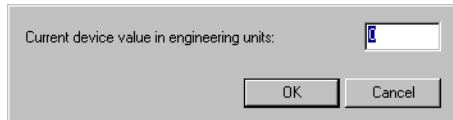
### 5.10.5 Performing an Automated Calibration

To perform an automated analog output calibration,


1. Select the desired analog output by clicking anywhere in the corresponding row.
2. Click the  button or press the F8 key.

You can abort this process at any time by clicking the  button.

3. The Zero Scale Adjustment dialog appears.



The dialog box has a title bar and a light gray background. It contains the text "Current device value in engineering units:" followed by a text input field. Below the input field are two buttons: "OK" and "Cancel".

Input the appropriate value and click the  button.

## NOTICE

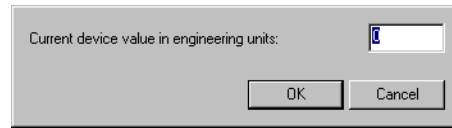
To determine the uncalibrated Zero Scale and Full Scale analog output levels, see [Section 5.10.1](#).


## NOTICE

To prevent scale adjustment, set both adjustment values to zero (0.0).

See [Appendix D](#) for additional instructions on calibrating analog outputs. [Appendix D](#) also includes a calibration example for an output scale of 0 to 1200.

4. The Full Scale Adjustment dialog appears.



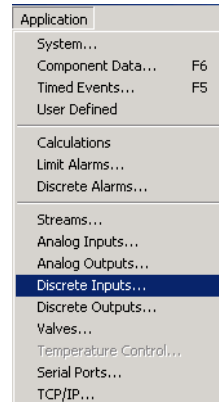
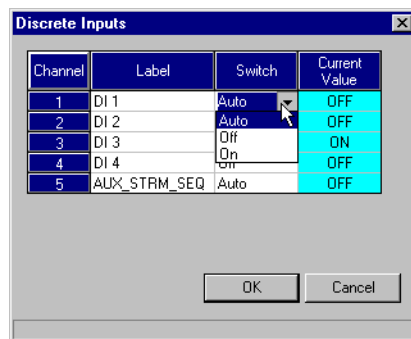
Input the appropriate value and click the  button.

5. If the values entered are within tolerance, data in the zero and full adjustment columns is updated. Otherwise, MON2000 displays an error message.

## 5.11 DISCRETE INPUTS

Use this function to assign labels to the GC discrete inputs and control their operational modes. The number of discrete inputs available depends on the GC application.

1. Use the *Application > Discrete Inputs* menu to access this function.
2. The Discrete Inputs dialog appears.




To edit the settings displayed, double-click the appropriate cell or click and use the provided pull-down menus.

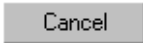
See the following table for details.

Table 5-10 Description of Discrete Input Settings

Setting	Description
Channel	channel number assigned
Label	name used to identify the discrete input (12 characters maximum)
Switch	sets operational mode for this discrete input  Auto = value is determined by application Off = value is set to OFF On = value is set to ON
Current Value	current state of the discrete input



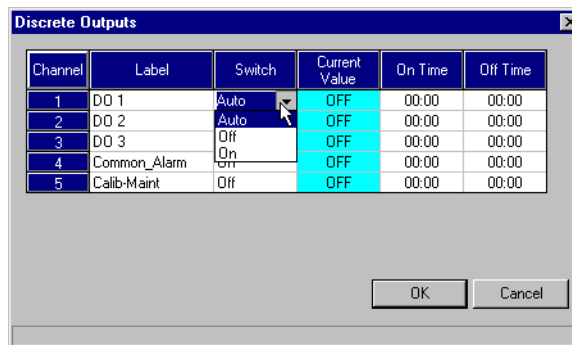
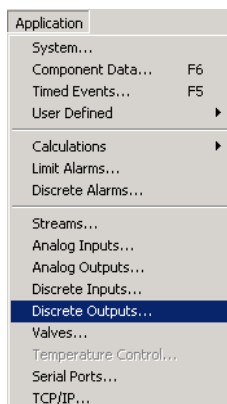
3. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

## 5.12 DISCRETE OUTPUTS

Use this function to assign labels to the GC discrete outputs and control their operational modes. The number of discrete outputs available depends on the GC application.

1. Use the *Application > Discrete Outputs* menu to access this function.
2. The Discrete Outputs dialog appears.



### NOTICE

Signals routed to discrete outputs are assigned via the Limit Alarm and Discrete Alarm functions (see [Section 5.6](#) and [Section 5.7](#)).


To edit the settings displayed, double-click the appropriate cell or click and use the provided pull-down menus.

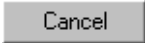
See the following table for details.

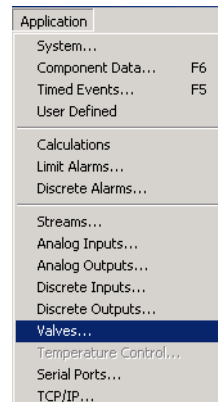
Table 5-11 Description of Discrete Output Settings

Setting	Description
Channel	channel number assigned
Label	name used to identify the discrete output (12 characters maximum)
Switch	sets operational mode for this discrete output  Auto = value is determined by application Off = value is set to OFF On = value is set to ON
Current Value	current state of the discrete output
On Time Off Time	time the digital output will be turned ON/OFF (MON2000 clock based on user PC system clock)

If the ON/OFF times are the same, the timing feature has no effect.

3. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.



## 5.13 VALVES

This function allows you to:

- assign identifying labels
- monitor valve operation
- control the operation modes

The number of discrete outputs available depends on the GC application.

To use the Valve function,

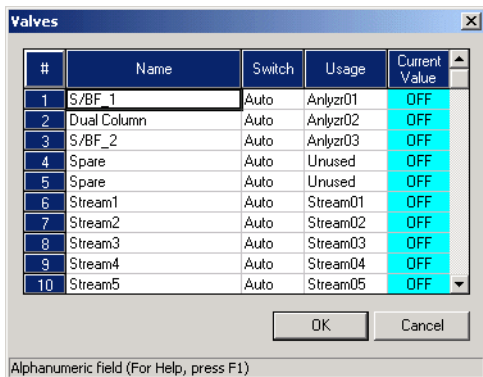
1. Use the *Application > Valves* menu to access this function.

### NOTICE

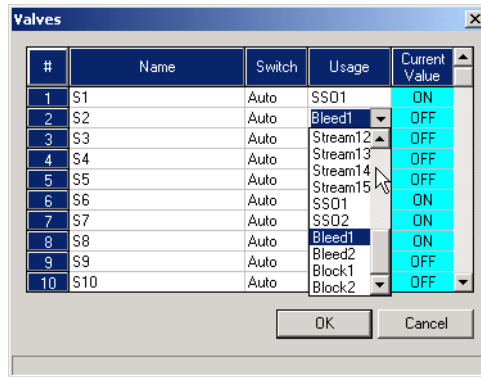
**2350A GC Controllers support up to 12 Stream valves and 5 Analyzer valves, for a total of 17 valves.**

**Model 700 controllers support up to Analytical Valves (AV-1 to AV-5 and S-1 to S-8 Stream valves**

2. The Valves dialog appears, per GC type.



**Valves dialog for Model 700 GC**




**Valves dialog for 2350A GCs**

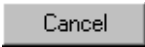
To edit the settings displayed, double-click the appropriate cell or click and use the provided pull-down menus.

See the following table for details.

*Table 5-12 Description of Valve Settings*

Setting	Description
Channel	channel number assigned
Label	name used to identify the valve (12 characters maximum)
<div> <h2 style="background-color: #0070C0; color: white; padding: 5px; display: inline-block;">NOTICE</h2> </div> <p><b>By default, the 2350A GC stream valves are shown first and are labeled S1 - S12 followed by the analytical valves (AV1 - AV5). Model 700 GCs analytical valves are shown first and are labeled AV1 - AV5 followed by the stream valves (S1 - S8).</b></p>	
Switch	sets operational mode for this valve  Auto = valve operation is determined by the GC application Off = valve is set to OFF On = valve is set to ON
Usage (Model 700 and Model 500 GCs with 2350A Controllers)	sets which digital output from the Timed Events function (see <a href="#">Section 5.3</a> ) is assigned to this valve  Each Usage option is created per the following example: 1-AV1 - where the digit "1" is taken from the valve number set by the Valve/DO# option (see Timed Events, see <a href="#">Section 5.3</a> ), and the name "AV1" is taken from Label set in this Valve dialog.
<div> <h2 style="background-color: #0070C0; color: white; padding: 5px; display: inline-block;">NOTICE</h2> </div> <p><b>The same Usage assignment cannot be used for multiple valves, unless these valves are set to "Unused".</b></p>	
Current Value	current state of the valve

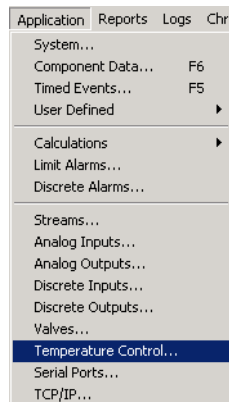
3. Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

## 5.14 TEMPERATURE CONTROL

Use the Temperature Control function for monitoring the Temperature of the Oven (Detector/s and Columns) and the Stream Switching block to determine when the Model 700 is thermally stable. The bottom row labeled Temperature (C) displays the current temperatures.

The settings and values are shown in the following figure and table. The settings and values are preset at the factory and are based on the specific customer application. These values should not be changed unless recommended by Daniel Customer Service Personnel, or it is a factory application requirement.



1. Use the *Application>Temperature Control* menu to access this function.
2. The Temperature Control dialog displays.

The Temperature Control dialog box contains a table with the following data:

Loop	1	2	3	4
Mode	Automatic	Automatic	Automatic	Out of Service
Prop Gain	60	60	60	60
Reset	600	600	600	600
Rate	1	1	1	1
D Filter	5	5	5	5
Setpoint	80	80	40	22
Output	100.00	100.00	100.00	40.00
Temperature(C)	26.01	25.53	21.98	173.84

Buttons: OK, Cancel

Selection field (For Help, press F1)

- Use the pull down menu to select the appropriate mode setting (e.g. AUTOMATIC, MANUAL, or OUT OF SERVICE). Ensure that the temperature is constant for the Oven (i.e. Multivalve System block and column module kit) and the SSS.

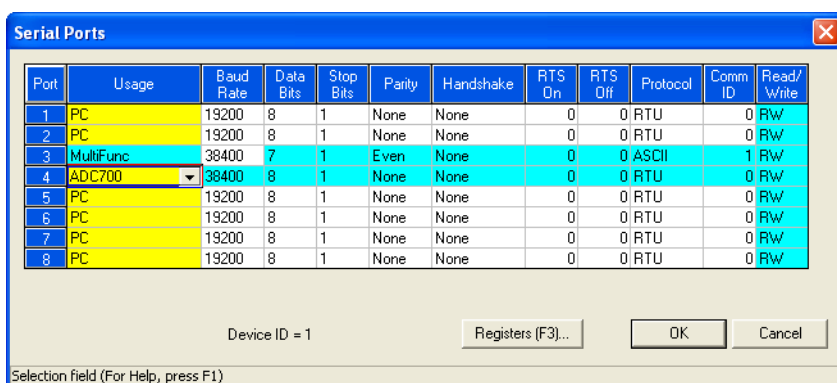
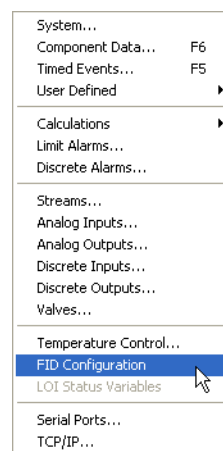
Column	Function	Factory Default Setting
Column 1	Detector/s or Block Temperature	80° C (176.0° F)
Column 2	Column Temperature	80° C (176.0° F)
Column 3	Sample Stream Block Temperature	40° C (104.0° F)
Column 4	(Spare)	Future Use

- Click the **OK** button to apply the changes or click the **Cancel** button to discard your changes and return to the MON2000 Main window.

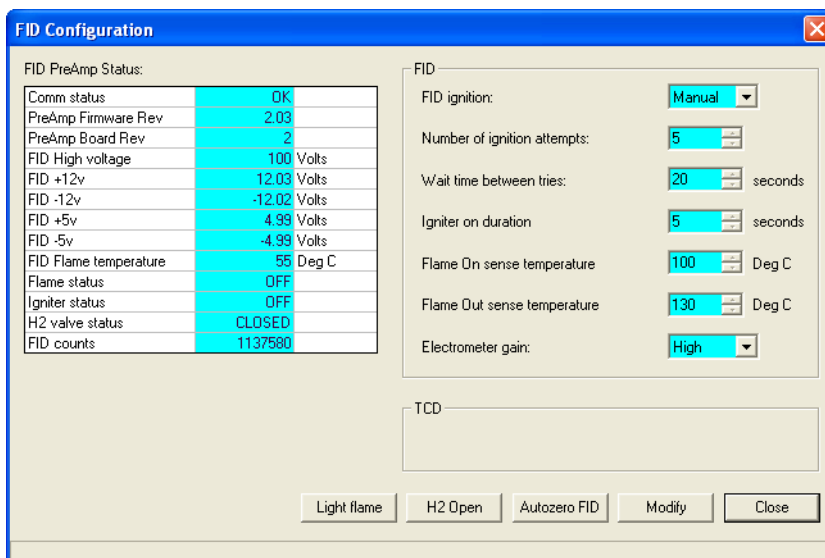
## 5.15 FID CONFIGURATION

Use this function to view the status information about the Model 700 Gas Chromatograph's Preamplifier Assembly, as well as to modify certain FID parameters.

To access the FID Configuration window, MON2000 must be connected to a GC that has its serial port #4 configured to use 'ADC700'.



1. Use the *Application > FID Configuration* menu to access this function. The FID Configuration window appears.



Information concerning the current status of the FID Preamplifier Assembly displays in the upper left corner.

2. To modify FID parameters, do the following:
  - (a) Halt the analysis.

- (b) Click **Modify**. The blue background of the parameter fields will turn white, indicating that they are now modifiable.

FID PreAmp Status:	
Comm status	OK
PreAmp Firmware Rev	2.03
PreAmp Board Rev	2
FID High voltage	100 Volts
FID +12v	12.06 Volts
FID -12v	-12.03 Volts
FID +5v	4.98 Volts
FID -5v	-4.99 Volts
FID Flame temperature	55 Deg C
Flame status	OFF
Igniter status	OFF
H2 valve status	CLOSED
FID counts	1136912

**FID**

FID ignition:

Number of ignition attempts:

Wait time between tries:  seconds

Igniter on duration:  seconds

Flame On sense temperature:  Deg C

Flame Out sense temperature:  Deg C

Electrometer gain:

TCD:

Light flame H2 Open Autozero FID Save Cancel

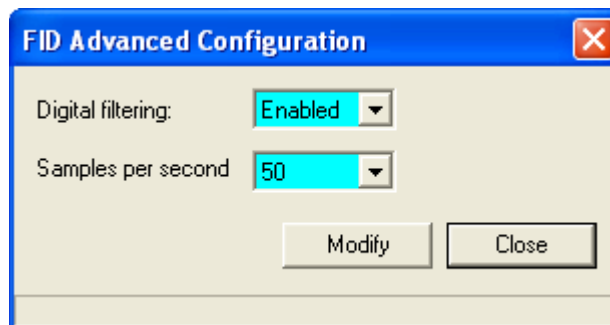
The parameters that you can configure are:

- FID ignition - Select *Manual* if you wish to control the ignition of the FID (default); select *Auto* to let the GC control the ignition of the FID.
  - Number of ignition attempts - Indicates the number of times the GC will try to light the flame. If an 'Auto' FID ignition sequence fails to light the flame after the specified number of attempts, the GC will close the hydrogen valve, switch the FID ignition parameter to *Manual*, and set an active alarm.
  - Wait time between tries.
  - Igniter on duration.
  - Flame On sense temperature.
  - Flame Out sense temperature.
  - Electrometer gain - Your choices are *High* and *Low* (default).
- (c) Click **Save** to accept the changes or **Cancel** to reject them.

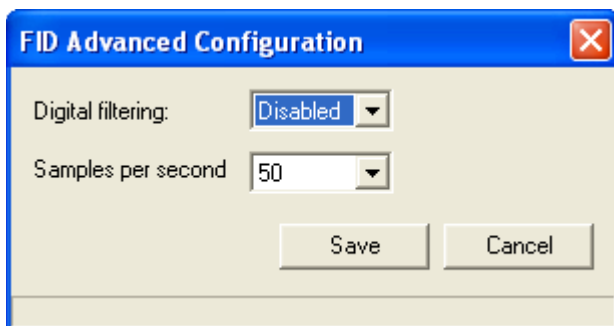


3. If *Flame status* is OFF, due to a power failure or maintenance, for example, you can restart the flame by doing the following:
  - (a) Click **H2 Open**. The *H2 valve status* parameter displayed in the FID PreAmp Status table changes to OPEN.
  - (b) Click **Light flame**. The *Flame status* parameter displayed in the FID PreAmp Status table will change to ON when the FID internal temperature exceeds the value set in the *Flame On sense temperature* field.

If **FID ignition** is set to *Auto*, the GC will automatically restart the flame if it goes out.
4. To enable or disable digital filtering, do the following:
  - (a) Right-click on the FID Configuration window. The FID Advanced Configuration window appears.



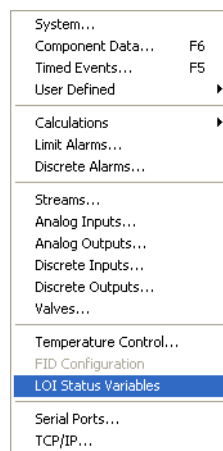
- (b) Click **Modify** to make the appropriate selection from the *Digital filtering* drop-down list.



- (c) Click **Save** to accept the change, or **Cancel** to reject the change.
- (d) Click **Close** to leave the FID Advanced Configuration window.
5. To reset the *FID counts* parameter, click **Autozero FID**.

## 5.16 LOI STATUS VARIABLES

Use this function to select and configure up to 25 GC parameters that you would like to monitor using the LOI's *Display* mode (refer to the *Model 700 Gas Chromatograph System Reference Manual* for more information about this mode).



1. Use the *Application > LOI Status Variables* menu to access this function. The LOI Status Variables window appears.



2. If *Include Mole Percents for current stream* is checked, which is the default, the maximum number of variable you can select is five; if *Include Mole Percents for current stream* is not checked, you can choose up to 25 variables.
3. To select a new variable, click on the appropriate drop-down list under the Variable column.
4. Select a stream from the drop-down list in the Stream column. If you want to use the current stream, select '0' in this column.

To copy the stream settings from a highlighted row and apply them to the next row, click the **Copy S+ (F7)** button or press the F7 key. This feature also increments the *Stream* value to the next available stream (e.g., incrementing from Stream 2 to Stream 8), per the GC application.

5. Select a component from the drop-down list in the Component column. If you do not want to use a component, select '0' in this column.

To copy the component settings from a highlighted row and apply them to the next row, click the **Copy C+ (F8)** button or press

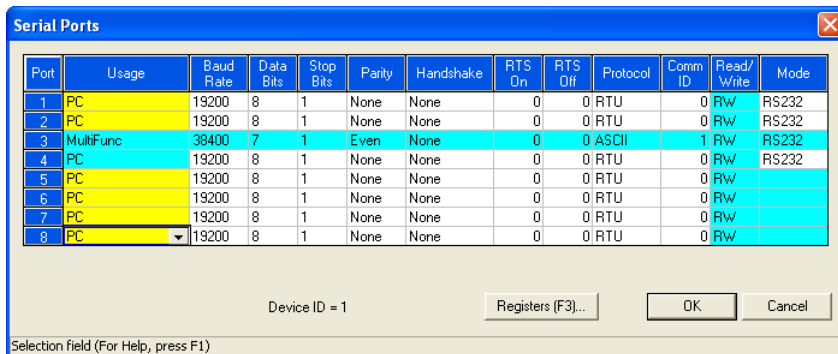
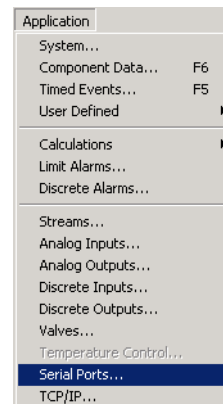
the F8 key. This feature also increments the *Component* value to the next available component (e.g., incrementing from “Ammonia” to “Benzene”), per the GC application.

6. Enter a value in the Precision column that indicates the number of decimal places to display for this particular variable. For component concentrations, the range of possible Precision values is between 2 and 6. For all other variables, the range of possible values is between 0 and 6.

## 5.17 SERIAL PORTS

Use this function to configure and manipulate the serial port communication parameters the GC Controller uses to connect with MON2000.

1. Use the *Application > Serial Ports* menu to access this function.
2. The Serial Ports dialog appears.



## NOTICE

The Mode column applies only to the following CPU boards:

- 2350A CPU board (P/N 2-3-2350-190)
- Model 700 CPU board (P/N 2-3-0700-036)

To edit the settings displayed, double-click the appropriate cell or click and use the provided pull-down menus.

## NOTICE

**For proper communications, these parameters, which are continuously downloaded to the GC, must be identical to the parameters set in the MON2000 GC Directory.**

See the following table and individual sections for details.

*Table 5-13 Description of Serial Port Settings*


Setting	Description
Port	<p>Serial port number for GC Controller.</p> <p>The Model 700 and Model 500 with 2350A Controller (with the PC/104 COM 4A board installed) the controller supports 8 ports (9 ports with the modem).</p> <p>With the Multifunction board installed, COM3 is the assigned port.</p>
Usage	<p>Defines port usage – such as a slave configuration (i.e., User_Modbus, SIM_2251), PC communication port, a Report, or Serial Port – as well as the general type of serial communications protocol.</p> <p>To accommodate installations that use Modbus registers and the SIM_2251 protocol along with a data acquisition system, MON2000 enables you to arrange data values for a more effective polling.</p> <p>Note that the contents of all SIM_2251 Modbus registers are predefined, and the values for component variables are predetermined. However, a cross-index to these predefined assignments can be developed.</p> <p>With the Multifunction board installed, COM3 is the assigned port.</p>

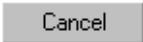
Table 5-13 Description of Serial Port Settings (Continued)

Setting	Description
Baud Rate	<p>Baud rate setting.</p> <p>Range: 1200, 2400, 4800, 9600, 19200, 38400.</p> <p>For high performing PCs, set the baud rate to 19200. If you experience a communications failure at this rate, set the baud rate to 9600. Baud rate settings less than 9600 may result in real-time delivery that is unacceptably slow.</p>
Data Bits	<p>Number of data bits.</p> <p>Range: 7, 8. Default: 8.</p>
Stop Bits	<p>Number of stop bits.</p> <p>Range: 1, 2. Default: 1.</p>
Parity	<p>Parity check method.</p> <p>Range: None, Even, Odd. Default: None.</p>
Handshake	<p>Handshaking method.</p> <p>Range: None, RTS-CTS, XON-XOFF. Default: None.</p>
RTS On	<p>Delay in milliseconds between RTS activation and the start of data transmission .</p> <p><b>NOTE:</b> If used, it may be necessary to set an extra delay in the GC Directory, accessed via the File&gt;GC Directory menu.</p> <p>Range: 0 to 5000.</p>
RTS Off	<p>Delay in milliseconds between RTS termination and the end of data transmission.</p> <p>Range: 0 to 5000.</p>
Protocol	<p>Transmission protocol.</p> <p>Range: ASCII, RTU Default: ASCII</p>

*Table 5-13 Description of Serial Port Settings (Continued)*

<b>Setting</b>	<b>Description</b>
Com ID	Modbus slave address.  To use the address defined by the GC Controller DIP switches, set to 0.
Read/Write	Read/write setting  Range: R (Read only), W (Write only), RW (Read and write).  This parameter only functions with slave ports.
Mode	Only applies to 2350A CPU board (P/N 2-3-2350-190) or Model 700 CPU board (P/N 2-3-0700-036).  Sets the communication protocol directly, instead of through jumper settings.  Range: RS232, RS422, RS485.

Click the  button to accept your changes and return to the main window.

Click the  button to abort and return to the main window.

### 5.17.1 Serial Ports Configuration

Each GC Controller port number is listed in the Port column of the Serial Ports dialog. The number of available ports is hardware-specific.

These ports can be configured with the Usage settings to accommodate any one of the following end-connection devices:

## NOTICE

The optional internal modem installed on a Model 700 or Model 500 uses COM9 only, except when a keyboard and display are installed. The optional internal modem would then use COM8 only.

## NOTICE

For proper communications, these parameters, which are continuously downloaded to the GC, must be identical to the parameters set in the MON2000 GC Directory.

- PC – direct serial line connection to the PC, a serial line connection to an external or internal modem or an ethernet connection
- Report – direct serial line connection to a printer
- User\_Modbus or SIM\_2251 – connection to a Data Collection System (DCS) or a multi-drop serial data highway network

Specific configurations of these ports may also include settings for serial interface protocols (i.e., RS-232, RS-485, or RS-422).

These protocols can either be set from the Serial Ports window, or they can be configured through jumper settings that are located on the



CPU board. See the appropriate GC hardware manual for instructions and drawings.

**NOTICE**

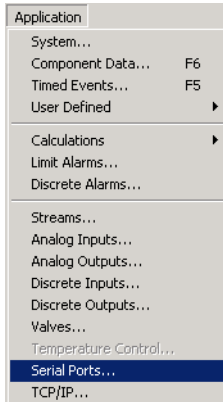
Communications between the GC and a DCS or multi-drop serial data highway can be established with Modbus protocol. For this, the Usage setting should be either User\_Modbus or SIM\_2251.

In any Modbus host-slave configuration, there must be one Host to which any one of the GCs can respond as a Slave. Thus, the controller could be connected to a maximum of 4 different serial data networks.

The serial interface protocol RS-232 will service most end-connection devices (i.e., PC and Report). DCS connections use either RS-485 or RS-422 protocols although, in some cases, the RS-232 protocol can be used.

To access this function,

1. From the *Application*>*Serial Ports* menu, select the Usage column and use the pull-down menu to select the appropriate configuration.



The 'Serial Ports' window displays a table with the following data:

Port	Usage	Baud Rate	Data Bits	Stop Bits	Parity	Handshake	RTS On	RTS Off	Protocol	Comm ID	Read/Write	Mode
1	PC	19200	8	1	None	None	0	0	RTU	0	RW	RS232
2	PC	19200	8	1	None	None	0	0	RTU	0	RW	RS232
3	MultiFunc	38400	7	1	Even	None	0	0	ASCII	1	RW	RS232
4	PC	19200	8	1	None	None	0	0	RTU	0	RW	RS232
5	PC	19200	8	1	None	None	0	0	RTU	0	RW	
6	PC	19200	8	1	None	None	0	0	RTU	0	RW	
7	PC	19200	8	1	None	None	0	0	RTU	0	RW	
8	PC	19200	8	1	None	None	0	0	RTU	0	RW	

Below the table, the text 'Device ID = 1' is displayed. There are buttons for 'Registers (F3)...', 'OK', and 'Cancel'. A note at the bottom says 'Selection field (For Help, press F1)'.

## NOTICE

The Mode column applies only to the following CPU boards:

- 2350A CPU board (P/N 2-3-2350-190)
- Model 700 CPU board (P/N 2-3-0700-036)

### 5.18 GC SERIAL PORT AND CABLE CONFIGURATIONS

This section provides more detailed information about the serial port connections of the 2350A GC Controller. It identifies serial port pin assignments and diagrams for designing RS-232 serial cables necessary for your application.

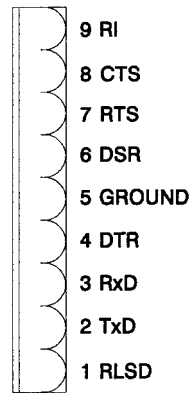
GC serial ports are found on the GC Controller Terminal Board for field wiring, and the connection points for external devices are as follows:

*Table 5-14 Serial Ports on GC Terminal Board*

Port	DB-9 Plug	Phoenix Plug
1 (COM1)	P2	J5
2 (COM2)	P3	J6
3 (COM3)	n/a	J10
4 (COM4)	n/a	J11

External modem connections can be made to any of the four serial ports. However, a possible exception exists for Serial Port 4: the internal modem for the Model 500 with the 2350A Controller, if installed, uses Serial Port 4.

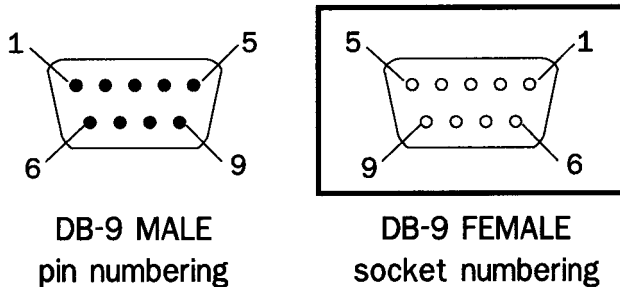
Phoenix plug (bare-wire) connections are available to all four serial ports. Pin-outs are identical for all four serial port Phoenix plugs and jacks. Each Phoenix plug / jack (male) combination allows bare-wire connection and uses 9 pins as illustrated:



*Figure 5-1 Phoenix Connector Pinout for J5, J6, J10, J11*

DB-9 plug connections available for serial ports 1 and 2 only. Two of the serial ports, as noted in [Table 5-14](#), permit connection to an external modem via a DB-9 plug.

Both of the GC Controller DB-9 jacks are female and have identical pin assignments.



## NOTICE

A DB-9 male pin numbering scheme is also illustrated, but for reference purposes only.

pinout for both DB-9 female jacks at GC Controller

5	4	3	2	1
GND	DSR	RxD	TxD	RLSD
9	8	7	6	
RI	RTS	CTS	DTR	

Figure 5-2 DB-9 Connector and Pinout, P2 and P3

### 5.18.1 GC DB-9 Serial to External Modem DB-25

To make an RS-232 serial connection between one of the DB-9 serial ports of the GC, and an external modem with DB-25 serial port, you will need to manufacture a cable. The cable will need DB-9, male, and DB-25, male, plug cable ends as illustrated in [Figure 5-3](#).

## NOTICE

GC serial ports were wired to appear as DCE so that a straight-through serial cable could be used, instead of a null-modem cable, for direct serial connection between the GC Controller and the PC, which is Data Terminal Equipment (DTE).

The DB-9 jack on the GC serial port is wired to appear like a Data Communications Equipment (DCE). Therefore, you use a custom

“null-modem” type cable, as shown below, to make the connection between the GC and an external modem.

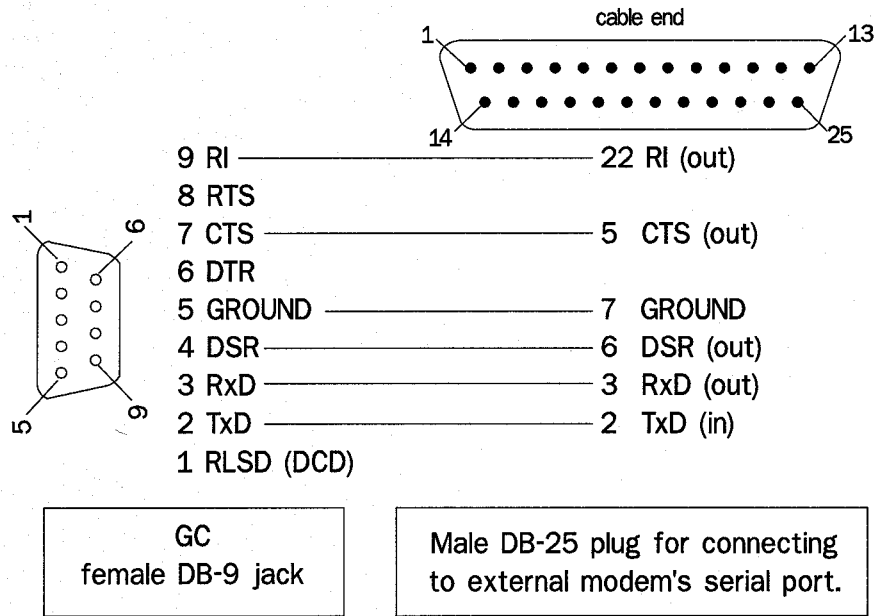


Figure 5-3 GC DB-9 Port to External Modem DB-25 Port

### 5.18.2 GC Phoenix Plug to External Modem DB-25

To make an RS-232 serial connection between one of the Phoenix Plug serial ports of the GC, and an external modem with DB-25 serial port, you will need to manufacture the cable and its DB-25, male plug cable end as illustrated in [Figure 5-4](#).

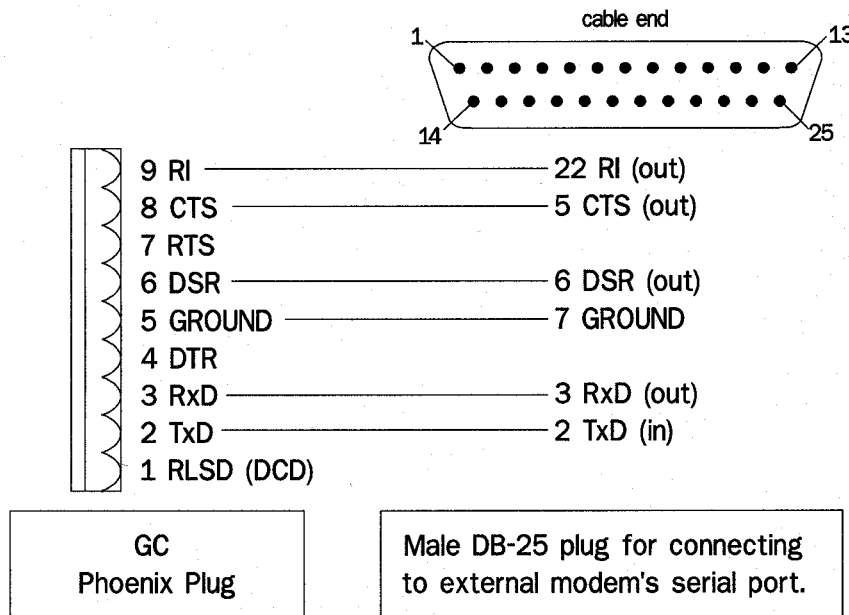


Figure 5-4 Phoenix Plug Port to External Modem DB-25 Port

### 5.18.3 Com ID

The GC Controller Com ID is usually preset at the factory and defined by the DIP switch settings on the controller system interface board. Five switches are reserved for defining the Com ID; therefore, Com ID values range from 1 to 31.

Normally it is not necessary to change the Com ID value to anything other than 0. Setting the Com ID to zero allows the MON2000 software to automatically recognize the Com ID defined by the controller DIP switches. When connected, MON2000 displays the controller DIP setting as the Com ID in the main window titlebar. See Table 5-15 for more information.

*Table 5-15 Description of Com ID Settings*

<b>Connection</b>	<b>Usage</b>	<b>Read/Write</b>	<b>Protocol</b>
PC or modem (direct serial connection)	PC User_Modbus SIM_2251	R RW	ASCII RTU
DCS	User_Modbus SIM_2251	R RW	ASCII RTU
Printer (direct serial connection)	Report	W	ASCII

1. User\_Modbus and SIM\_2251 are slave port protocols (the GC Controller can operate only as a slave).
2. User\_Modbus, a PLC emulation Modbus protocol, can use scaling to convert floating point numbers to integers.
3. SIM\_2251 emulates Daniel 2500 communication protocol and is a simulation of the 2251 GC Controller.
4. See Appendix I for instructions on how to connect a modem to the GC Controller.

### 5.18.4 Registers

To accommodate installations that use Modbus registers and the User\_Modbus protocol, MON2000 enables you to assign GC analysis variables to registers.



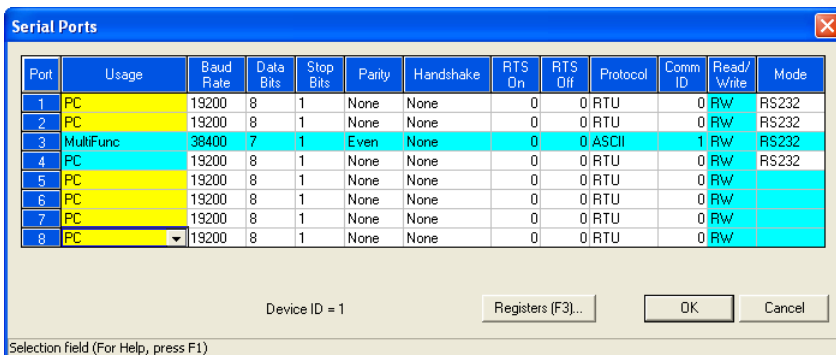
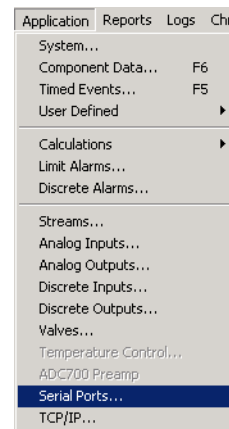
**This function is not required for normal GC operation. Only use this function if you are designing a special installation to directly access the GC Controller Modbus registers.**

See [Appendix F](#) for more information regarding GC Modbus registers.

For a list of variable assignments made to all registers, print the communication section of the PC Config Report.

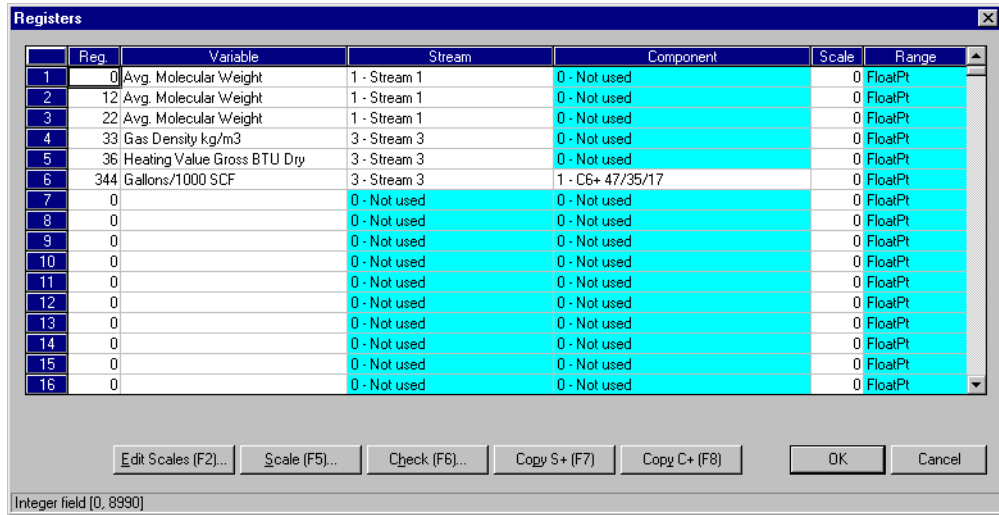
To assign GC analysis variables and scale ranges,

1. Use the *Application>Serial Ports* menu to access this function.
2. The Serial Ports dialog displays.





- From the Serial Ports dialog, click the **Registers (F3)...** button or press the F3 key.
- The Registers dialog appears.



- View or edit data. Double-click a given table cell or use one of the edit function buttons, described below, to make your changes.

## NOTICE

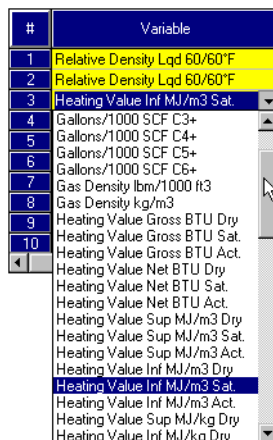
**For each default 0 FloatPt scale assigned, reserve 2 Modbus registers for a given variable.**

**Scale assignments other than 0 FloatPT require only one register per variable.**

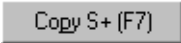
Note that the Reg column displays the number for the GC Controller Modbus register that will be polled by a connected data acquisition system.

- To change a variable assignment, click the appropriate Variable cell. Use the provided pull-down menu and click the desired variable to select it.

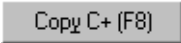
From the Variables menu, you can assign the results of optional base pressure(s) to the Modbus register. See [Section 5.18.5](#).



7. To change the stream assignment, click the appropriate cell. Use the provided pull-down menu and click the desired stream to select it.

To copy the stream settings from a highlighted row and apply them to the next row, click the  button or press the F7 key. This feature also increments the Stream value to the next available stream (e.g., incrementing from Stream 2 to Stream 8), per the GC application. An error message displays when the last available stream is reached.

8. To change the component assignment, click the appropriate cell. Use the provided pull-down menu and click the desired option to select it.

To copy the component settings from a highlighted row and apply them to the next row, click the  button or press the F8 key.

This feature also increments the Component value to the next available component (e.g., incrementing from Ammonia to Benzene), per the GC application. An error message displays when the last available component is reached.

9. To select a scale and range,
  - (a) Select the scale/range to be replaced.

By assigning a scale range, a floating point value can be converted to an integer value per the user-defined scale assignment.

## NOTICE

**Assigning a scale and corresponding range is an optional step.**

**The default scale assignment is 0 FloatPt, which means the value is not converted to integer and is stored in two (2) adjacent Modbus registers.**

- (b) Click the **S**cale (F5)... button or press the F5 key. A menu list of all available scales and ranges appears.
- (c) Double-click the desired new scale and corresponding range.

Note that any of the available 33 scales can be redefined via the Edit Scales function (see Step 10).

10. To redefine a scale or create a custom scale,

- (a) Click the **E**dit Scales (F2)... button or press the F2 key.
- (b) The Edit Scales dialog appears.

Scale #	Zero	Full
2	0	1
3	0	2
4	0	5
5	0	10
6	0	20
7	0	30
8	0	40
9	0	50
10	0	60
11	0	70
12	0	80
13	0	90
14	80	120
15	0	200
16	0	300
17	0	400
18	0	500
19	0	600
20	0	700
21	0	800

#	Zero Scale	Full Scale
0	0.0	4095.0
1	0.0	100.0
2	0.0	1.0
3	0.0	2.0
4	0.0	5.0
5	0.0	10.0
6	0.0	20.0
7	0.0	30.0
8	0.0	40.0

All 33 scaling options will display.

- (c) Input the new Zero Scale or Full Scale values as appropriate.

## NOTICE

To convert floating point data to a whole integer, each scale definition follows this algorithm:

$$integer = \left( \frac{R_F - R_Z}{S_F - S_Z} \right) D_{fp} = 3977$$

where


$R_F$  = range, Full Scale = 4095

$R_Z$  = range, Zero Scale = 0

$S_F$  = scale, Full = 100


$S_Z$  = scale, Zero = 0

$D_{fp}$  = data, floating pt = 97.13  
(% from Methane)

- (d) Click the  button to accept your changes and return to the Registers dialog.


Click the  button to abort and return to the Registers dialog.

11. To check for conflicting Modbus register assignments,

- (a) Click the  button or press the F6 key.
- (b) MON2000 displays the first encountered error.



For this example, you would change the register number for Row 2. You would then verify all subsequent register numbers as well.

- (c) Click the  button to accept your changes and return to the Serial Ports dialog. MON2000 automatically checks for conflicting Modbus register assignments.

Click the  button to abort and return to the Serial Ports dialog.

### 5.18.5 Setting Optional Base Pressures

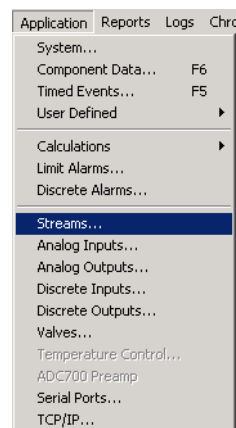
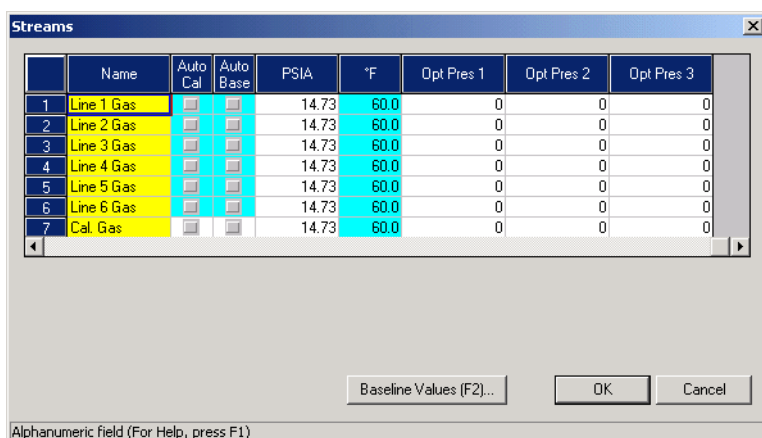
As discussed in [Section 5.18.4](#), you can assign GC analysis variables to various Modbus registers. Follow the procedure below to add the “Optional Base Pressure” variable to the Registers List.


Up to three (3) optional base pressures can be used for GC analysis calculations. These optional base pressure values are entered via the Streams function (see [Section 5.8](#)).

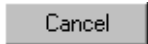
- “Results - Opt. Base Press” – A group of 12 GC analysis calculations can be used to reflect the use of different base pressures. See [Section C.3](#) for more information.

To assign the “Optional Base Pressure” variable,

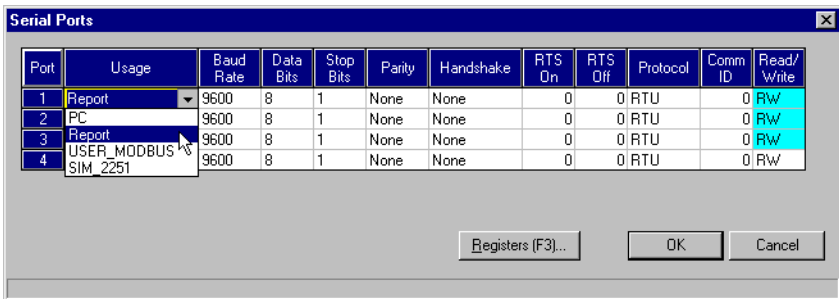
1. Verify the values for optional base pressures that have already been entered.
  - (a) Use the *Application > Streams* menu to access this function.
  - (b) The Streams dialog box displays.



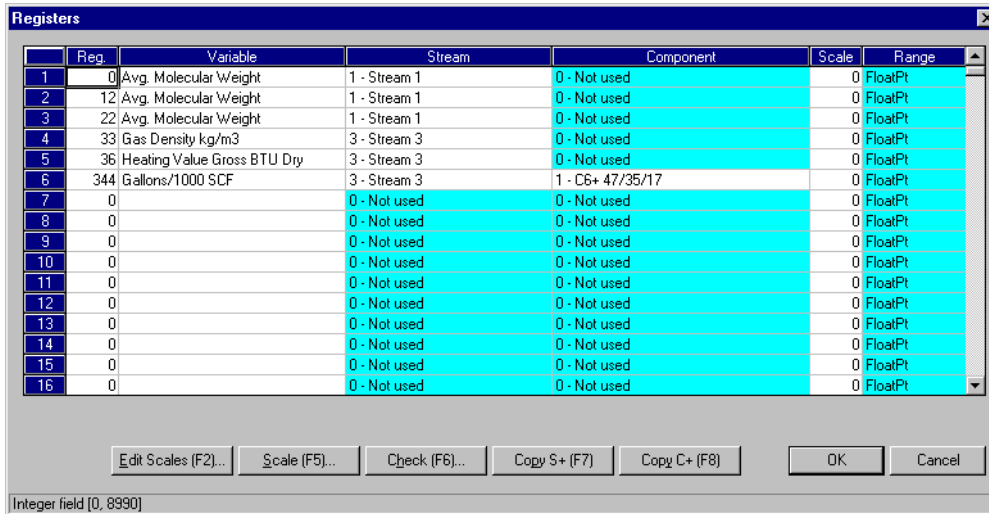
- (c) Scroll to the Opt Press columns and note these values along with the corresponding optional pressure and stream number(s).
- (d) If you wish to enter different pressure values, do so now and then click the  button to accept your changes.

Otherwise, click the  button to return to the main window.

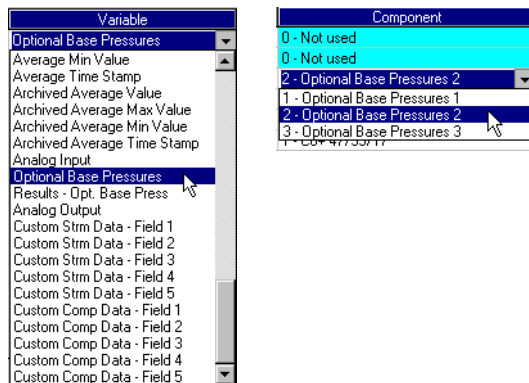
2. Use the *Application > Serial Ports* menu to access the Register function.



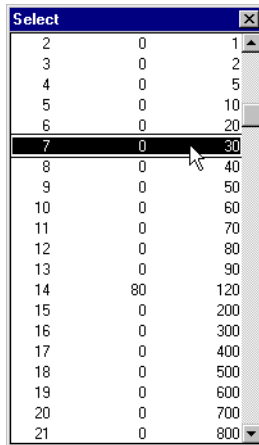
- From the Serial Ports dialog, click the **Registers (F3)...** button or press the F3 key. The Registers dialog appears.



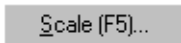
- From the Registers dialog, use the Variable pull-down menu to select the *Optional Base Pressures* option.
- Use the corresponding component pull-down menu to select the desired optional base pressure option.








Row	Col 1	Col 2
2	0	1
3	0	2
4	0	5
5	0	10
6	0	20
7	0	30
8	0	40
9	0	50
10	0	60
11	0	70
12	0	80
13	0	90
14	80	120
15	0	200
16	0	300
17	0	400
18	0	500
19	0	600
20	0	700
21	0	800

- To assign a scale, ensure that the correct row is selected and click the  button or press the F5 key. Double-click the desired scale option to apply.

For instructions on creating or editing a scale, see [Section 5.18.4](#).

- The “Optional Base Pressure” variable should be listed with the settings specified.
- Click the  button to accept your changes.

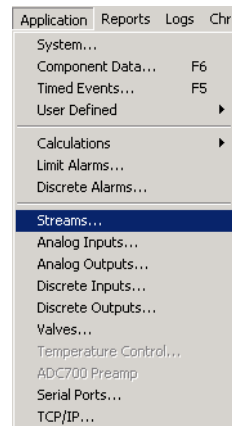
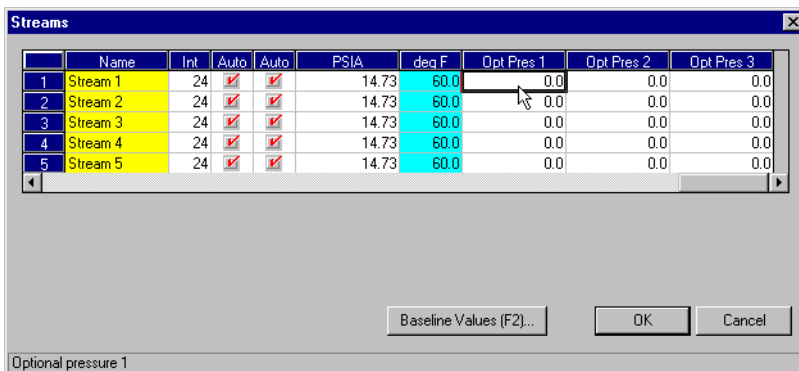
### 5.18.6 Setting Optional Base Results

As discussed in [Section 5.18.4](#), you can assign GC analysis variables to various Modbus registers. Follow the procedure below to add the “Results - Opt. Base Press” variable to the Registers List.

A group of 12 GC analysis calculations can be used to reflect the use of different base pressures. [See Section C.3](#) for more information.


To assign the “Results - Opt. Base Press” variable,


1. Verify the values for optional base pressures that have already been entered.
  - (a) Use the *Application > Streams* menu to access this function.
  - (b) The Streams dialog displays.



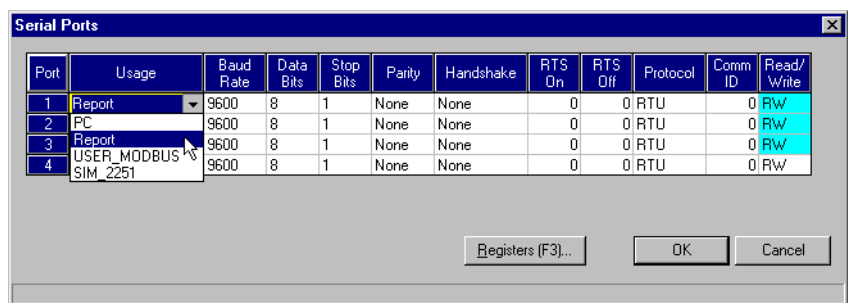
- (c) Scroll to the Opt Press columns and note these values along with the corresponding optional pressure and stream number(s).


(d) If you wish to enter different pressure values, do so now and then click the

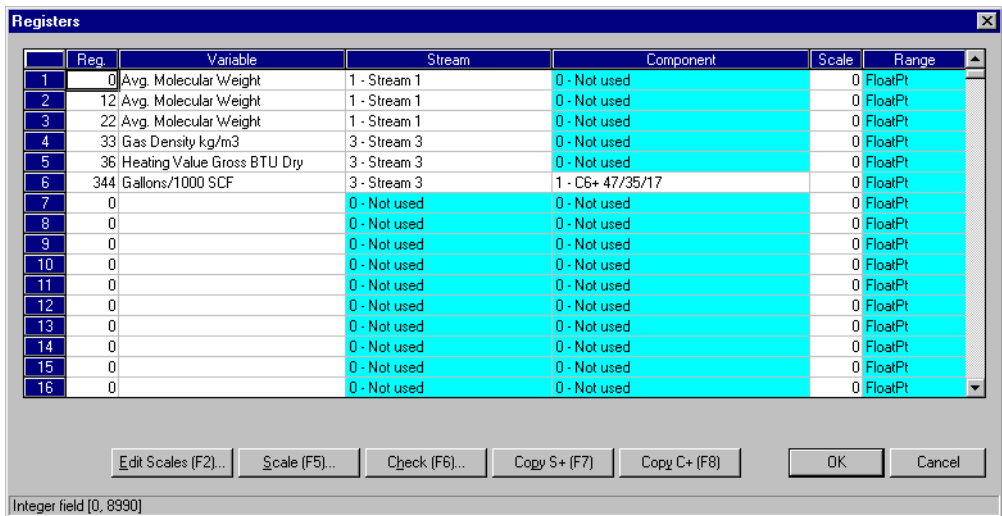
 button to accept your changes.

Otherwise, click the  button to return to the main window.

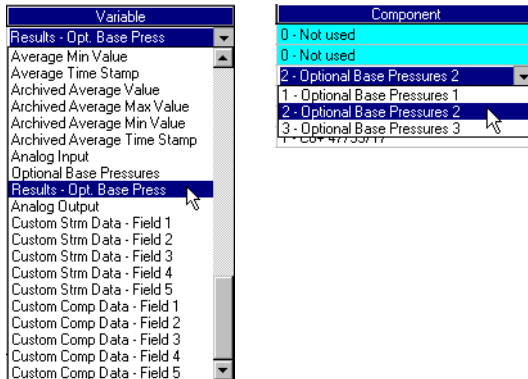
2. Use the *Application > Serial Ports* menu to access this function.



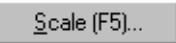
3. From the Serial Ports dialog, click the  button or press the F3 key. The Registers dialog appears.




- From the Registers dialog, use the Variable pull-down menu to select the *Results - Opt. Base Press* option.
- Use the corresponding component pull-down menu to select the desired optional base pressure option.



See Table 5-16 to determine which number you should enter.

- To assign a scale, ensure that the correct row is selected and click the  button or press the F5 key. Double-click the desired scale option to apply.

For instructions on creating or editing a scale, see Section 5.18.4.

- The “Results - Opt. Base Press” variable should be listed with the settings specified.
- Click the  button to accept your changes.

## NOTICE

**Metric GC analysis variables are available only if the Metric Base Conditions option has been enabled (see Section 5.1).**

Select		
2	0	1
3	0	2
4	0	5
5	0	10
6	0	20
7	0	30
8	0	40
9	0	50
10	0	60
11	0	70
12	0	80
13	0	90
14	80	120
15	0	200
16	0	300
17	0	400
18	0	500
19	0	600
20	0	700
21	0	800

Table 5-16 GC Analysis Variable Number per Optional Pressure

GC Analysis Variable		Optional Pressure		
U.S.	Metric	1	2	3
Gross Heating Value or Btu (Dry)	Heating Value, Superior, MJ/m <sup>3</sup> (Dry)	1	13	25
Gross Heating Value or Btu (Sat.)	Heating Value, Superior, MJ/m <sup>3</sup> (Sat.)	2	14	26
Gross Heating Value or Btu (Act.)	Heating Value, Superior, MJ/m <sup>3</sup> (Act.)	3	15	27
Net Btu (Dry)	Heating Value, Inferior, MJ/m <sup>3</sup> (Dry)	4	16	28
Net Btu (Sat.)	Heating Value, Inferior, MJ/m <sup>3</sup> (Sat.)	5	17	29
Net Btu (Act.)	Heating Value, Inferior, MJ/m <sup>3</sup> (Act.)	6	18	30
Real Relative Density Gas	Heating Value, Superior, kcal/m <sup>3</sup> (Dry)	7	19	31
Gallons/1000 SCF C2 +	Heating Value, Superior, kcal/m <sup>3</sup> (Sat.)	8	20	32
Gallons/1000 SCF C3 +	Heating Value, Superior, kcal/m <sup>3</sup> (Act.)	9	21	33
Gallons/1000 SCF C4 +	Heating Value, Inferior, kcal/m <sup>3</sup> (Dry)	10	22	34
Gallons/1000 SCF C5 +	Heating Value, Inferior, kcal/m <sup>3</sup> (Sat.)	11	23	35
Gallons/1000 SCF C6 +	Heating Value, Inferior, kcal/m <sup>3</sup> (Act.)	12	24	36

Table 5-16 GC Analysis Variable Number per Optional Pressure (Continued)

GC Analysis Variable		Optional Pressure		
		1	2	3
U.S.	Metric			

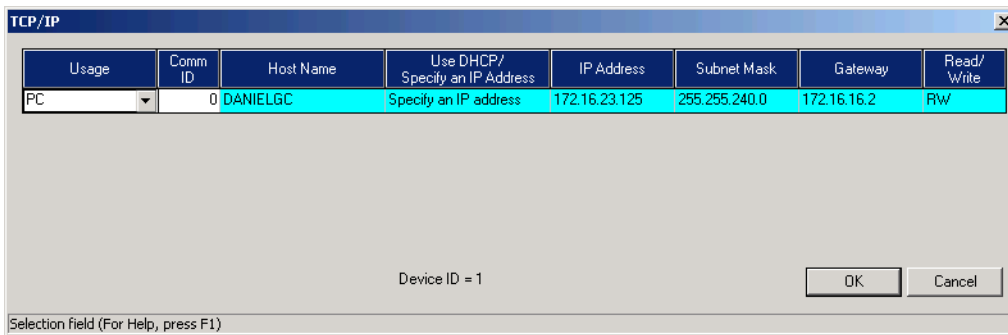
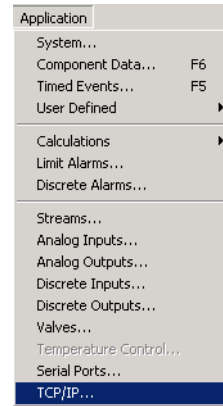
**NOTICE**

Use the above index numbers to assign "Results - Opt. Base Press" to User\_Modbus registers.

**5.19 TCP/IP, SUBNET, AND GATEWAY MENU**

Use this function to configure the TCP/IP, Subnet, and Gateway communication parameters for the 2350A GC Controller.

1. Use the *Application > TCP/IP* menu to access this function.
2. The TCP/IP dialog displays.  
[See Appendix F](#) for detailed instructions for the Ethernet card installation, TCP/IP, Subnet, and Gateway settings.



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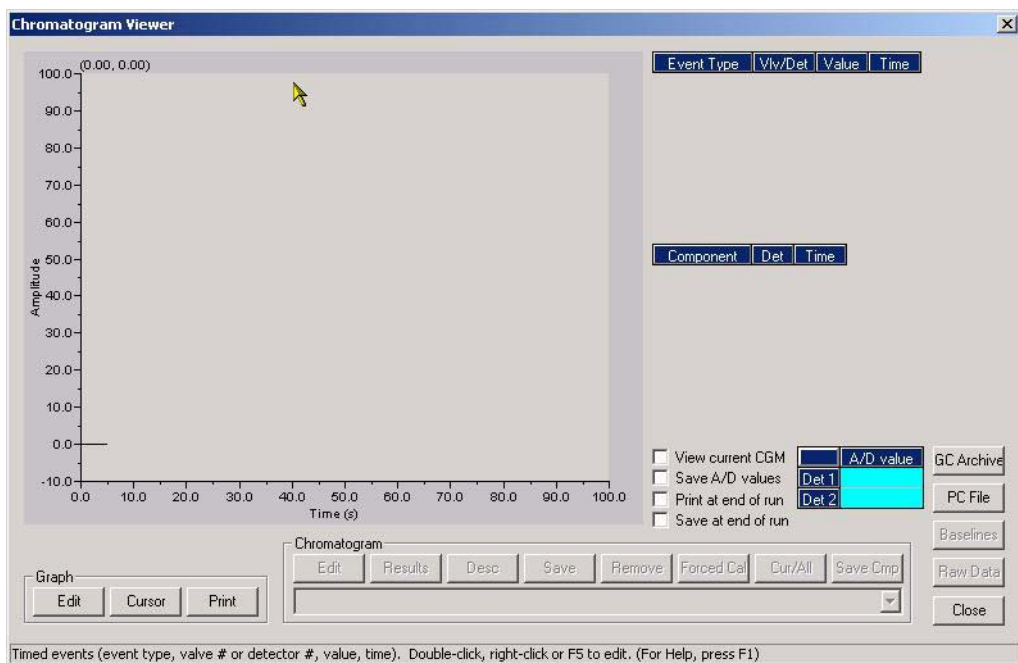
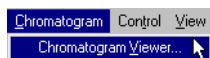
## CHROMATOGRAM VIEWER

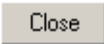
Use the Chromatogram Viewer to display and print live, archived, or saved chromatograms (from a **.cgm** file on disk). The 2350A GC Controller saves the most recent chromatograms for each stream running in the Stream Sequence, as well as the chromatogram from the most recent calibration run for each CDT. See the following sections for further instructions.

### 6.1 CHROMATOGRAM VIEWER FUNCTION

To access the Chromatogram Viewer,

1. Connect to the GC.
2. Use the *Chromatogram > Chromatogram Viewer* menu to access this function.
3. The Chromatogram Viewer dialog appears.



- Click the  button to exit this dialog. Any display changes or open data will be lost. See [Section 6.4](#) to save a chromatogram to disk.

## 6.2 VIEWING A LIVE CHROMATOGRAM

### 6.2.1 From Online GC

To view a live chromatogram trace from the online GC,

- Check the *View current CGM* option.

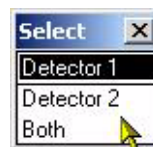
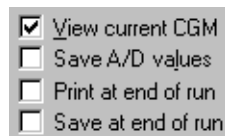
If a chromatogram contains data for more than one detector, a Select Detector menu dialog displays. Double-click either “Detector 1”, “Detector 2”, or “Both”.

- MON2000 plots the current, live chromatogram.

The corresponding data is dynamically displayed in the provided legends.

Use the Graph and Chromatogram functions to manipulate the display. To zoom in on a particular point, click and drag your mouse over that area; repeat as necessary. Use the Restore State or Zoom Out options from the right-click menu (see [Section 6.9](#)) to return to the original display.

You can display up to 8 chromatograms at one time. Each chromatogram is color-

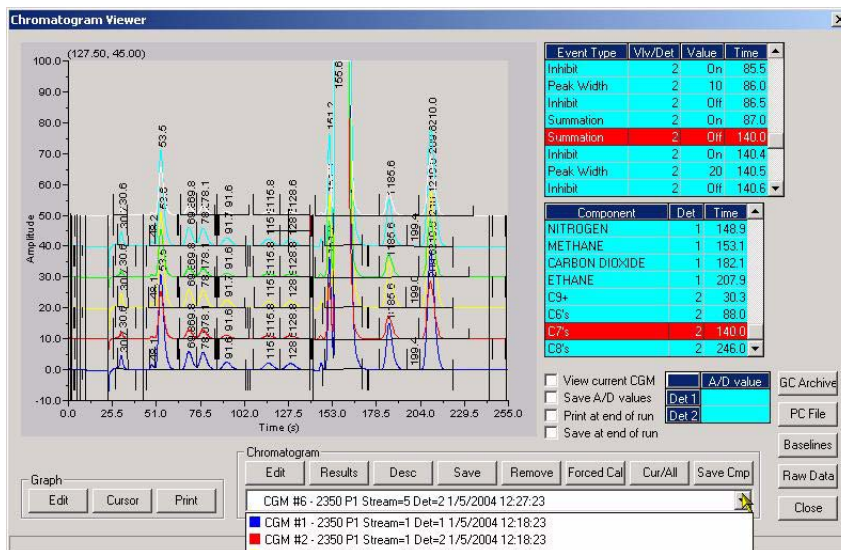


Tr	Type	Val	Num	Time
1	Detector	0	-1	0.0
1	Strm Switch	0	0	7.0
1	Peak Width	4	0	8.0
1	DO #	0	2	23.0
1	Integrate	1	0	100.0
1	Peak Width	3	0	143.0
1	Peak Width	8	0	173.0

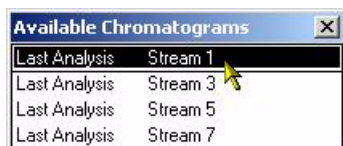
Tr	Component	Det	Time
1	PROPANE	1	50.2
1	i-BUTANE	1	65.7
1	n-BUTANE	1	73.6
1	NEOPENTANE	1	86.3
1	i-PENTANE	1	109.4
1	n-PENTANE	1	121.6
1	NITROGEN	1	149.5
1	METHANE	1	153.1

coded; use the Chromatogram pull-down menu to select a specific chromatogram.



### 6.2.2 From GC Archive

To view the most recent chromatogram trace from the online GC archive,



1. Click the **GC Archive** button. The Available Chromatograms dialog appears.
2. Double-click the desired entry.

If a chromatogram contains data for more than one detector, a Select Detector menu dialog displays. Double-click either “Detector 1”, “Detector 2”, or “Both”.

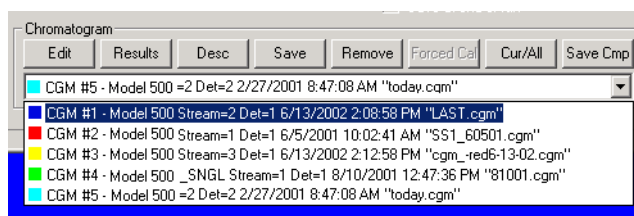
3. MON2000 plots the archived chromatogram.

The corresponding data is dynamically displayed in the provided legends.

Use the Graph and Chromatogram functions to manipulate the display. To

zoom in on a particular point, click and drag your mouse over that area; repeat as necessary. Use the Restore State or Zoom Out options from the right-click menu (see Section 6.9) to return to the original display.

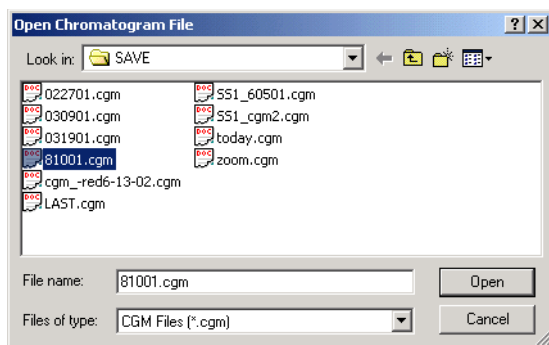
You can display up to 8 chromatograms at one time. Each chromatogram is color-coded; use the Chromatogram pull-down menu to select a specific chromatogram.



### 6.2.3 From File on Disk

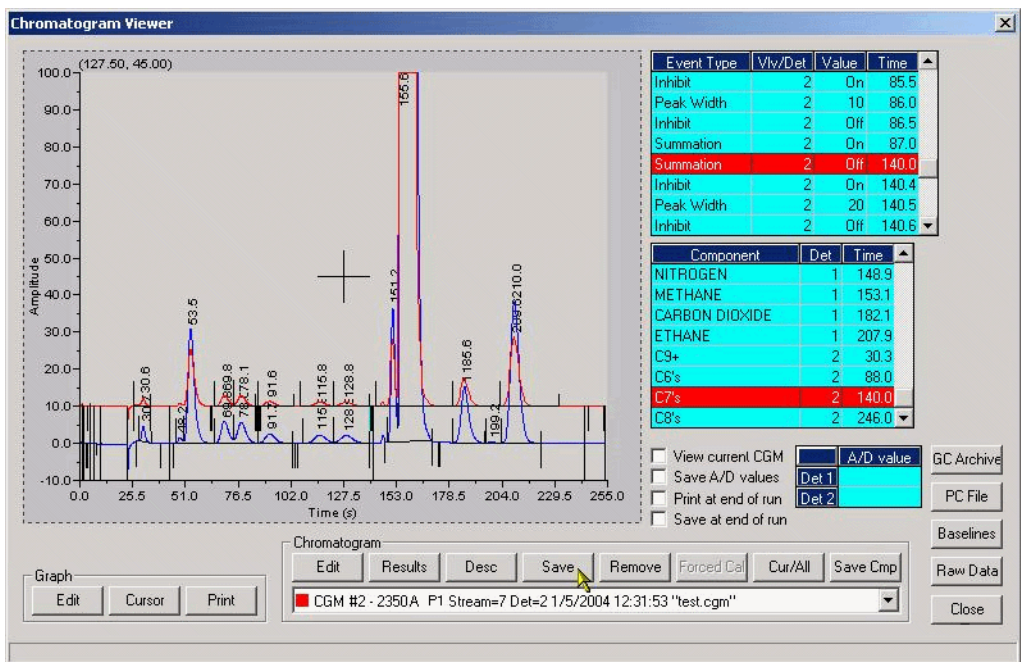
To view a chromatogram trace from a file previously saved to disk,

1. Click the **PC File** button. The Open Chromatogram File dialog appears.



2. Use the provided directory tree to locate the desired CGM file or CGM Comparison file and click the **OK** button to open.

## 3. The Chromatogram window displays.

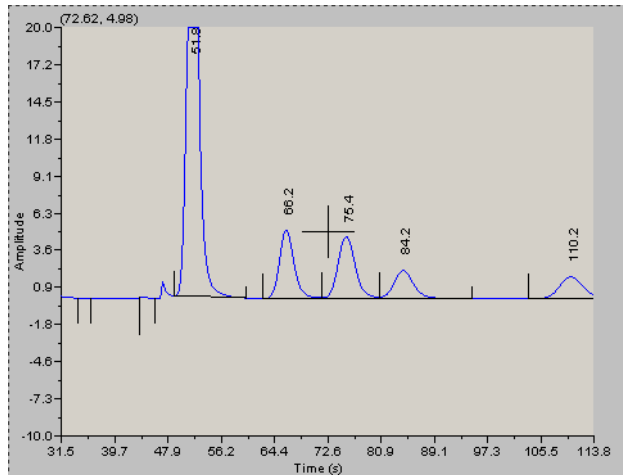


If a chromatogram contains data for more than one detector, a Select Detector menu dialog displays. Double-click either “Detector 1”, “Detector 2”, or “Both”.

## 4. MON2000 displays the chromatogram file.

The corresponding data is dynamically displayed in the provided legends.

Use the Graph and Chromatogram functions to manipulate the display. To zoom in on a particular point, click and drag your mouse over that area; repeat as necessary. Use the Save State, Restore State, or Zoom In or Out options from the right-click menu (see Section 6.9) to return to the original display for both Live and Archived CGM views. Press the keyboard HOME key to force the CMG view to the default state. Also, pressing the keyboard HOME key sets the CGM view to the default state if the current application analysis time is different from the previous application analysis time.



Tr	Type	Val	Num	Time
1	Detector	0	-1	0.0
1	Strm Switch	0	0	7.0
1	Peak Width	4	0	8.0
1	DD #	0	2	23.0
1	Integrate	1	0	100.0
1	Peak Width	3	0	143.0
1	Peak Width	8	0	173.0

Tr	Component	Det	Time
1	PROPANE	1	50.2
1	i-BUTANE	1	65.7
1	n-BUTANE	1	73.6
1	NEOPENTANE	1	86.3
1	i-PENTANE	1	103.4
1	n-PENTANE	1	121.6
1	NITROGEN	1	149.5
1	METHANE	1	153.1

**NOTICE**

The Save State function is available when viewing a live or archived CGM.

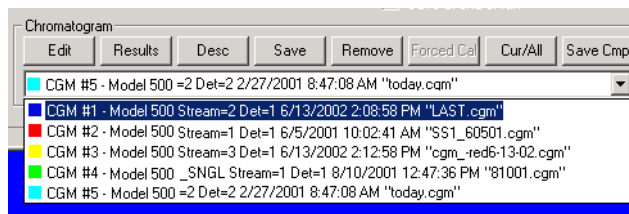
**NOTICE**

The MON2000 software looks for and finds the application's analysis time. Pressing the "Home" key returns the user to the default CGM state.

Zoom In	Num +
Zoom Out	Num -
Zoom X In	Num right arrow
Zoom X Out	Num left arrow
Zoom Y In	Num up arrow
Zoom Y Out	Num down arrow
Save State	Ctrl+Home
Restore State	Home
Cursor to Nearest Point	F8
Toggle Coarse/Fine Cursor	F4
Toggle Lines/Dots Display	F9
Toggle Mouse Position Tip	Ctrl+F4
Toggle Nearest Point Tip	Ctrl+F9
Print	Ctrl+P
Copy to clipboard	Ctrl+C
Paste from clipboard	Ctrl+V

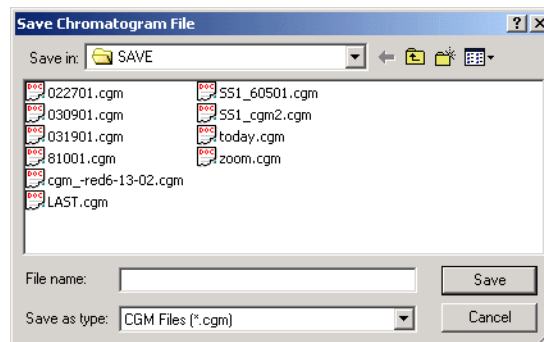
**Right Click Menu**

You can display up to 8 chromatograms at one time. Each chromatogram is color-coded; use the Chromatogram pull-down menu to select a specific chromatogram



5. Click the **Save Cmp** button to save the selected comparison file to disk.

The Save Chromatogram Comparison File dialog appears.



6. Enter the file name to be saved and click the **Save** button to save the file to disk.

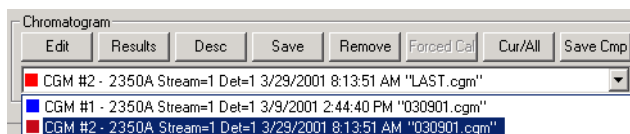
Or,

Click the **Cancel** button to exit this dialog.

### 6.3 REMOVING A CHROMATOGRAM FROM VIEW

To remove a chromatogram trace from the Viewer display (and close the cgm file, if reading from disk),

1. Use the Chromatogram pull-down menu to select a specific chromatogram.

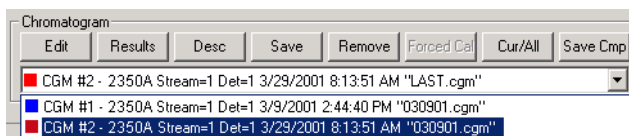


2. Click the **Remove** button. MON2000 removes the chromatogram from view and, if applicable, closes the .cgm file.

### 6.4 SAVING A CHROMATOGRAM TO DISK

To save a currently displayed chromatogram to disk,

1. Use the Chromatogram pull-down menu to select a specific chromatogram.



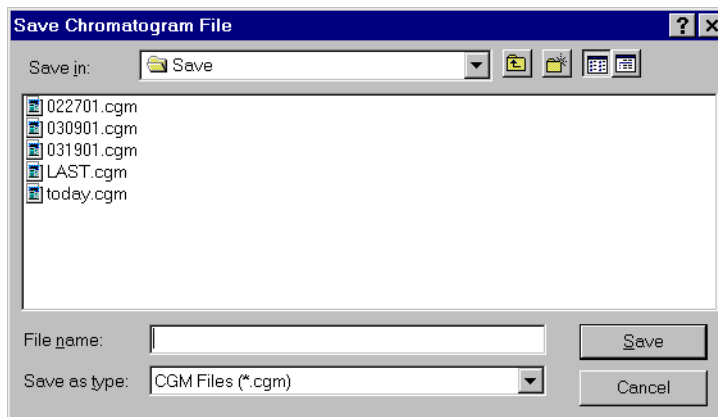
2. Click the **Save** button.

## NOTICE

This function will save a live chromatogram at the current point, thus overwriting the "last.cgm" file.



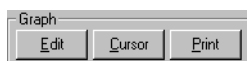
MON2000 displays the Save Chromatogram File window.



Use the provided directory tree to select the desired file location and name, then click the **Save** button.

- MON2000 saves the specified chromatogram along with its corresponding graph settings.

## 6.5 GRAPH FUNCTIONS

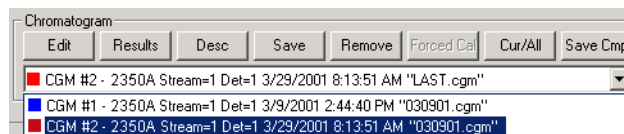


Use the Graph buttons to access any of the following graph-related functions.

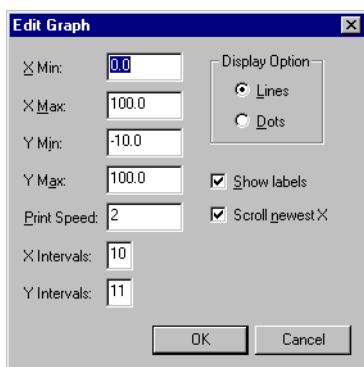
### 6.5.1 Editing the Chromatogram Graph

Use the Edit Graph function to change the span and interval for the x/y axis, as well as other display parameters.

- Use the Chromatogram pull-down menu to select a specific chromatogram.



2. Click the **Edit** button. The Edit Graph dialog appears.



3. Use the provided attributes and options to change the chromatogram display and printer speed as desired.
4. Click the **OK** button to accept your changes and return to the Chromatogram Viewer dialog.

Click the **Cancel** button to abort and return to the Chromatogram Viewer dialog.

5. The chromatogram display changes as specified.

Additional display options are available by right-clicking the display area. [See Section 6.9](#) for more information.

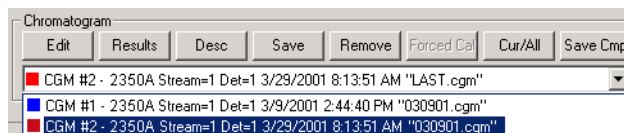
### 6.5.2 Changing Cursor Size

To toggle the cursor size from coarse movement (less accurate) to fine movement (more accurate), click the **Cursor** button.

### 6.5.3 Printing the Chromatogram

To print a currently displayed area of the chromatogram,

1. Use the Chromatogram pull-down menu to select a specific chromatogram.



2. Click the **Print** button.

## 6.6 CHROMATOGRAM FUNCTIONS

Use the Chromatogram buttons to access any of the following chromatogram-related functions.



### NOTICE

To save the displayed chromatogram to disk, see [Section 6.4](#).

To remove a chromatogram from view, see [Section 6.3](#).

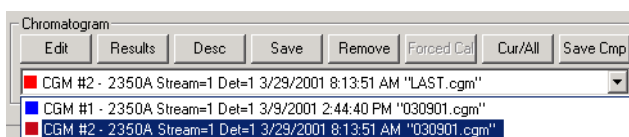
To toggle the TEV and CGM Component spreadsheet display, see [Section 6.6.8](#).

- Edit - edit the Chromatogram
- Results - view the CGM calculation results
- Desc - save a description of the CGM
- Save - save the displayed chromatogram to disk
- Remove - removes a chromatogram from view
- Forced Cal - perform a forced calibration
- Cur/All - toggle the TEV and CGM Component spreadsheet display
- Save CMP - save multiple CGMs

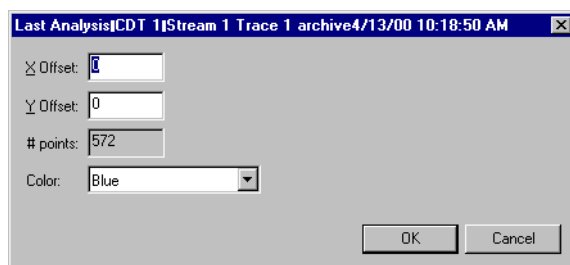
### 6.6.1 Editing the Chromatogram

Use the Edit Chromatogram function to change the x/y offset values and other display parameters such as color.

1. Use the Chromatogram pull-down menu to select a specific chromatogram.



2. Click the **Edit** button. The Edit Chromatogram dialog appears.



3. Use the *X Offset* and *Y Offset* values to change the chromatogram display as desired.
4. Use the *Color* pull-down menu to assign a different color to this chromatogram.
5. Click the **OK** button to accept your changes and return to the Chromatogram Viewer dialog.

Click the **Cancel** button to abort and return to the Chromatogram Viewer dialog.

**NOTICE**

In the edit mode, initial focus is applied to the currently selected event in the table, or to the event with the closest time.

**NOTICE**

If more than one CGM is displayed, only the selected CGM timed events will be available to edit.

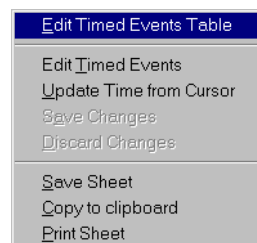
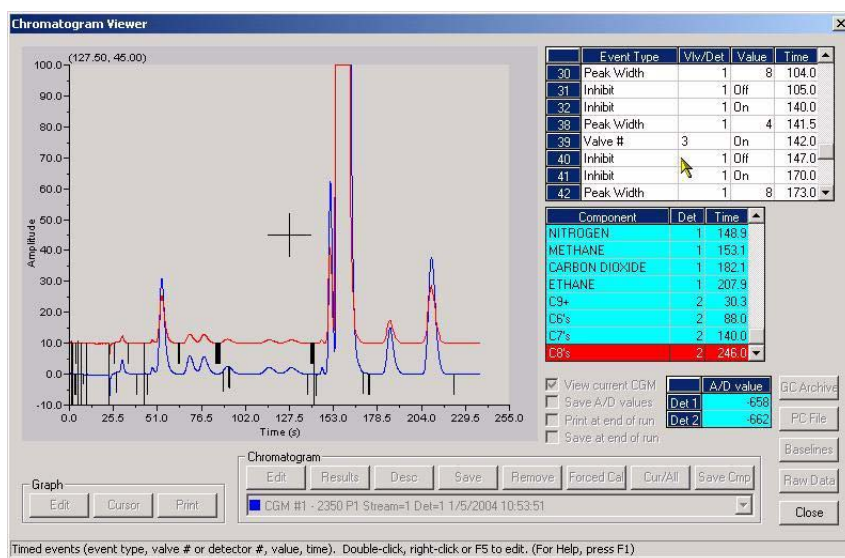
## 6.6.2 Editing TEVs from CGM Viewer

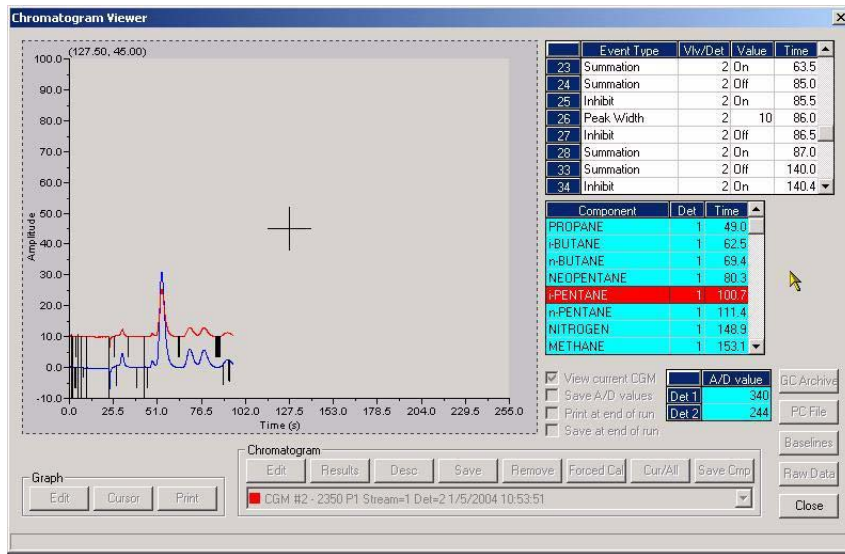
To edit the Timed Events Table (TEV) from the Chromatogram Viewer window,

1. Double-click the left mouse button, while hovering over the TEV legend, to edit the timed events from the CGM viewer (see the following figures).

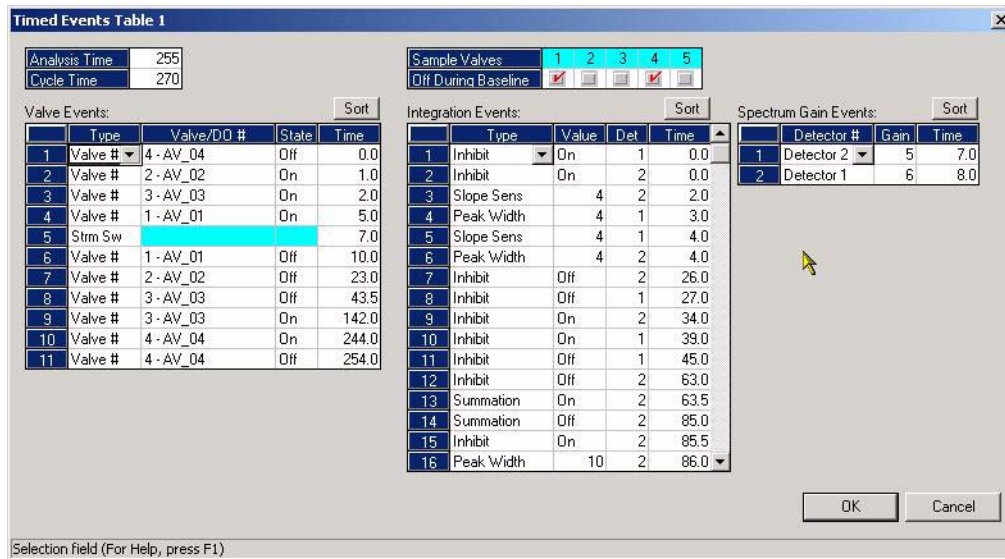
Or,

Right-click and use the drop-down menu to modify, add, insert, and delete TEV's via the normal editing procedures.





MON2000 displays the Timed Events Table dialog.

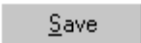


**NOTICE**

Save changes and discard changes options are available from the right-click menu.

**NOTICE**

You must access the Component Data Table to add, insert, and delete retention times. Use the *Application > Component Data* menu or press the F6 key.

2. Click the  button to save your changes, or press the F8 key.
3. Press the **ESC** key to discard changes.

**6.6.3 Editing Retention Times from CGM Viewer**

To edit component retention from the Chromatogram Viewer window,

1. Double-click the left mouse button to edit the retention times from the CGM viewer

Or,

Right-click and use the drop-down menu to modify retention times via the normal editing procedures.

**6.6.4 Editing TEVs from Cursor**

To update Timed Events from the Chromatogram Viewer using the cursor,

1. Right-click the mouse button, with the mouse pointer hovered over the Event Time legend.

Event Type	Vlv/Det	Value	Time
Inhibit	2	Off	27.0
Inhibit	1	Off	29.7
Inhibit	2	On	39.0
Inhibit	1	On	40.0
Valve #	3	Off	43.5
Inhibit			5.0
Inhibit			0.5
Inhibit			9.0

Edit Timed Events Table
Edit Timed Events
Update Time from Cursor
Save Changes
Discard Changes
Save Sheet
Copy to clipboard
Print Sheet

From the pull-down menu, select Update Time from Cursor.

Or,

Press the F9 key. MON2000 displays the message, "Reading GC Data" in the status bar, then activates the TEV Table.

	Event Type	Vlv/Det	Value	Time
25	Inhibit	1 Off		29.7
26	Inhibit	2 On		39.0
27	Inhibit	1 On		40.0
28	Valve #	3 Off	43.5	
29	Inhibit	2 Off		43.1
30	Inhibit	1 Off		50.5
31	Inhibit	2 On		89.0
32	Peak Width	2	8	92.0

- Click the **Save** button to save your changes, or press the F8 key.

Press the **ESC** key to discard changes.

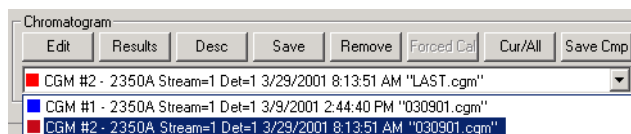
## NOTICE

Save changes and discard changes options are available from the right-click menu.

### 6.6.5 Viewing the Chromatogram Results

To read a table of calculation results for a selected chromatogram,

- Use the Chromatogram pull-down menu to select a specific chromatogram.



- Click the **Results** button. A dialog appears asking if the results should be displayed using the calculation control flags.
- Click the **Yes** button to display the report using the calculations selected in the *Application>Control* menu.



Click the **No** button to display the report using ALL calculations.

Calculation Results from 376326 stream 1 on 1/5/2000 10:45:20 AM

	MolPct	WgtPct	LiqVol	Gal/1000	BTUGross	BTUNet	RelDens	SDryMJm3
C6+ 47/35/17	0.0301	0.1599	0.0766	0.0134	1.59	1.47	0.0010	0.0592
PROPANE	0.9980	2.4395	1.5667	0.2751	25.17	23.16	0.0152	0.9375
iBUTANE	0.3012	0.9704	0.5613	0.0985	9.82	9.06	0.0060	0.3657
nBUTANE	0.2998	0.9658	0.5385	0.0945	9.80	9.05	0.0060	0.3651
NEOPENTANE	0.0993	0.3972	0.2167	0.0380	3.97	3.67	0.0025	0.1477
iPENTANE	0.1001	0.4002	0.2087	0.0366	4.01	3.71	0.0025	0.1495
nPENTANE	0.0999	0.3993	0.2060	0.0362	4.01	3.71	0.0025	0.1494
NITROGEN	2.4802	3.8505	1.5491	0.2718	0.00	0.00	0.0240	0.0000
METHANE	89.5968	79.6546	86.4960	0.0000	906.99	816.68	0.4963	33.7852
CARBON DIOXIDE	0.9989	2.4366	0.9699	0.1702	0.00	0.00	0.0152	0.0000
ETHANE	4.9957	8.3261	7.6104	1.3363	88.61	81.05	0.0519	3.3004
TOTAL	100.0000	100.0000	100.0000	1.9287	1053.97	951.55	0.6230	39.26
Compressibility Factor	1.0024							
Heating Value Gross BTU Dry	1056.45							
Heating Value Gross BTU Sat.	1038.07							
Heating Value Gross BTU Act.	1056.45							
Heating Value Net BTU Dry	953.79							
Heating Value Net BTU Sat.	937.19							
Heating Value Net BTU Act.	953.79							
Relative Density Gas Corr.	0.6242							
Gallons/1000 SCF C2+	1.9287							
Gallons/1000 SCF C3+	0.5924							
Gallons/1000 SCF C4+	0.3173							
Gallons/1000 SCF C5+	0.1243							
Gallons/1000 SCF C6+	0.0134							

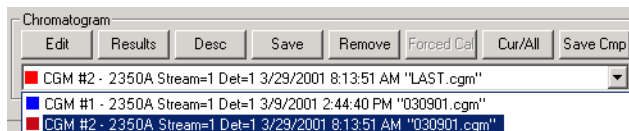
Cancel

Click the **Cancel** button to return to the Chromatogram Viewer dialog.

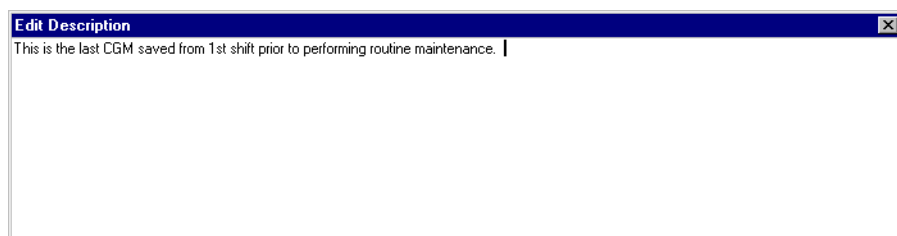
### 6.6.6 Entering a Description

To enter a description for the selected chromatogram,

1. Use the Chromatogram pull-down menu to select a specific chromatogram.



2. Click the **Desc** button. The Edit Description dialog appears.



3. Type the desired statement(s).
4. Press the ENTER key to accept this description.

Use the **X** button or press the ESC key to exit this dialog without accepting your entry.

5. Click the **Save** button to save this description with the chromatogram file.

**NOTICE**

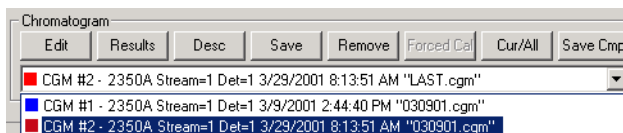
The selected GC Archive chromatogram must be from a good calibration gas run.

**6.6.7 Forcing a Calibration**

Use the Forced Cal function to calibrate the GC, using the raw data and stream number for the selected GC Archive chromatogram. The results are stored in the CDT under the corresponding stream number.

To perform a forced calibration,

1. Use the Chromatogram pull-down menu to select a specific chromatogram.

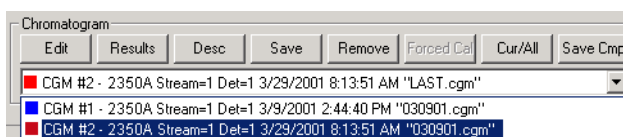


2. Click the **Forced Cal** button.

**6.6.8 Toggling TEVs and CGM Components**

To toggle the display of the TEV and CGM Component spreadsheets,

1. Use the Chromatogram pull-down menu to select a specific chromatogram.



2. Click the **Cur/All** button. If multiple CGMs are displayed in the graph area, the 'CUR/ALL' button toggles between showing all TEVs and all components for all CGMS to showing only the TEVs and components for the currently selected stream.

- MON2000 toggles the display of the TEVs and Components spreadsheets and the CGM view.

Event Type	Vlv/Det	Value	Time
Inhibit	2	Off	27.0
Inhibit	1	Off	29.7
Inhibit	2	On	39.0
Inhibit	1	On	40.0
Valve #	3	Off	43.5
Inhibit	2	Off	45.0
Inhibit	1	Off	50.5
Inhibit	2	On	89.0

Component	Det	Time
C6+ 47/35/17	1	30.0
PROPANE	1	49.0
i-BUTANE	1	62.5
n-BUTANE	1	69.4
NEOPENTANE	1	80.3
i-PENTANE	1	100.7
n-PENTANE	1	112.0
NITROGEN	1	148.9

Cur/All View 1

CGM#	Event Type	Vlv/Det	Value	Time
1	Inhibit	1	On	36.0
2	Inhibit	2	On	39.0
2	Inhibit	1	On	40.0
1	Valve #	3	Off	41.0
2	Valve #	3	Off	43.5
1	Inhibit	1	Off	44.0
2	Inhibit	2	Off	45.0
2	Inhibit	1	Off	50.5

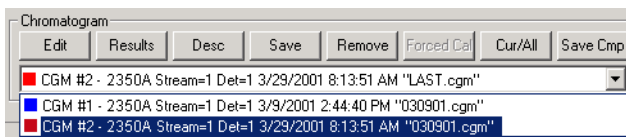
CGM#	Component	Det	Time
1	PROPANE	2	20.0
2	C6+ 47/35/17	1	30.0
1	METHANE	2	40.0
2	PROPANE	1	49.0
1	ETHANE	2	50.0
2	i-BUTANE	1	62.5
2	n-BUTANE	1	69.4
2	NEOPENTANE	1	80.3

Cur/All View 2

## 6.7 VIEWING BASELINE DATA

Use the Baseline function to display the retention times and baselines for the selected chromatogram.

- Use the Chromatogram pull-down menu to select a specific chromatogram.

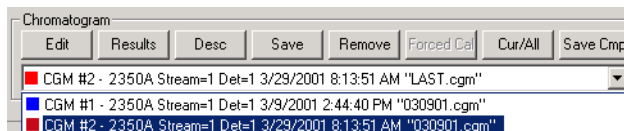


- Click the **Baselines** button. This removes the integration lines from a displayed Archive CGM.
- MON2000 displays a plot of the baseline values, and lists the corresponding retention times in the legend table.

## 6.8 VIEWING RAW DATA

Use the Raw Data function to display the Raw Data Table for the selected chromatogram.

1. Use the Chromatogram pull-down menu to select a specific chromatogram.



2. Click the **Raw Data** button. The Raw Data dialog displays and shows the raw data for all CGMs in the graph area.

Trace	Ret Time	Peak Area	Peak Height	Det	Mthd	Baseline Start	Baseline End	Integ Start	Integ End	Half Height
1	34.1	522364	8313	1	1	-126	-370	31.0	39.7	1.6
1	51.2	1.0545e+007	111211	1	4	878	-378	48.5	60.4	2.3
1	65.9	3.64824e+006	26836	1	2	-418	-551	61.6	70.4	3.2
1	73.9	3.89368e+006	24259	1	2	-418	-551	70.4	81.1	3.7
1	85.6	1.28672e+006	6578	1	103	-418	-551	81.1	96.0	4.5
1	108.8	1.37763e+006	5504	1	2	-604	-637	100.4	115.2	6.0
1	121.0	1.48942e+006	5195	1	3	-604	-637	115.2	136.8	6.8
1	154.1	1.67262e+007	305551	1	2	-511	1581	151.9	156.8	1.4
1	158.2	4.80294e+008	3946710	1	103	-511	1581	156.8	169.9	3.0
1	186.2	7.92345e+006	63625	1	4	-536	-531	181.4	197.4	3.0
1	200.4	15520	149	1	4	-537	-536	197.4	205.4	3.0
1	210.6	4.45147e+007	269704	1	101	-555	-479	205.4	222.8	4.0

3. Click the **Cancel** button to return to the Chromatogram Viewer dialog.

## 6.9 DISPLAY OPTIONS

Right-click the graph area to access these options, or use the corresponding keystroke(s). Options are listed in alphabetical order.

See [Table 6-1](#) for a complete listing of option names, descriptions, and keystroke sequences.

Table 6-1 Display Options for Chromatogram Viewer

Keystroke	Right-Click Option	Description
CTRL C	Copy to clipboard	allows you to copy this graph to another application such as MSWord or Excel
F8	Cursor to nearest point	snap cursor to nearest point in both the X and Y directions
CTRL V	Paste from clipboard	allows you to plot a range of points from another application such as MSWord or Excel
CTRL P	Print Graph Area	print currently displayed chromatograph area
CTRL S	Print Series All	print all displayed chromatograms
HOME	Restore State	restore last saved display settings for Live or Archived for the selected chromatogram
CTRL HOME	Save State	save current or archived display settings for the selected chromatogram
F4	Toggle Coarse/Fine	toggle cursor from coarse (less accurate) to fine (more accurate)
F9	Toggle Lines/Dots	toggle graph from line(s) to dots
CTRL F4	Toggle Mouse Position Tip	graph cursor follows movement of mouse while tooltip displays exact coordinates of the current point
CTRL F9	Toggle Nearest Point Tip	graph cursor follows movement of mouse cursor
NUM +	Zoom In	zoom in on entire graph
NUM -	Zoom Out	zoom out from entire graph
NUM →	Zoom X In	zoom in on X axis
NUM ←	Zoom X Out	zoom out from X axis
NUM ↑	Zoom Y In	zoom in on Y axis
NUM ↓	Zoom Y Out	zoom out from Y axis

## NOTICE

You must be currently online with the desired GC unit to generate a report from the controller.

## REPORTS

The options listed in the Reports menu enable you to display, print, or store various pre-configured GC reports.

See the following sections for more information on specific reports and related functions.

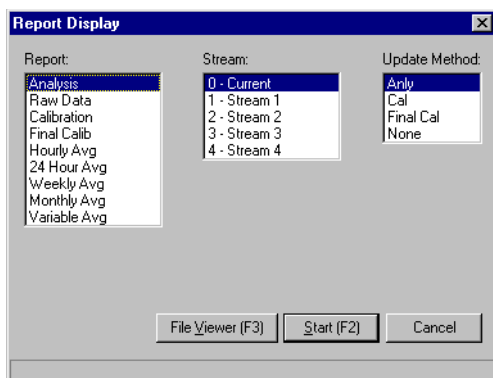
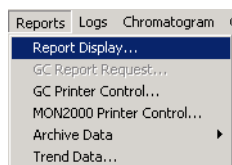
### 7.1 REPORT DISPLAY

This function allows you to immediately display, print, or store preconfigured reports on GC analysis data. Data is reported either real-time from the GC unit or from previously stored files.

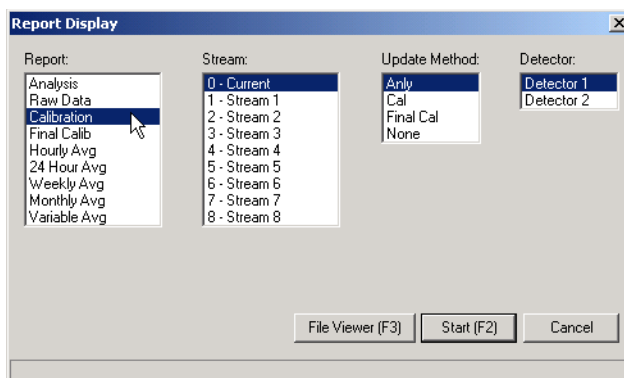
#### 7.1.1 View Report from Live Data

To display a report with live data from the GC unit,

1. Use the *Reports > Report Display* menu to access this function.
2. The Report Display dialog appears, per GC type.



**Report Display dialog for  
2350A GC Controllers**



**Report Display dialog for Model 700 GC**

3. Select the report type, stream, and update setting from the lists provided.


Table 7-1 Description of Report Display Settings

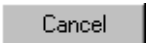
Setting	Description
Reports	list of pre-defined reports; Shows report type (Analysis, Raw Data, Calibration, etc...)
Select Stream	list of available streams  For a single detector GC: 0–Current = last stream analyzed  For a dual detector GC: 0–Current Det1 = last stream analyzed, Detector 1 0–Current Det2 = last stream analyzed, Detector 2
Update Method	list of update options that determine when the report display is refreshed  Anly = after each analysis Cal = after each calibration Fcal = after each final calibration None = not updated

## NOTICE

The contents of the GC analysis reports are defined by:

- the GC application
- functions such as Calculations, User Defined, Limit Alarms, and Streams

4. Click the  button or press the F2 key to generate and display the selected report.

To close this dialog without generating a report, click the  button to return to the main window.



5. MON2000 generates the report, per your specifications, and displays the results in the File Viewer dialog.

Calibration Run 3 of 3

Date-Time: 04/03/00 11:05 Analysis Time: 60 Cycle Time: 75  
 Stream: 1 Stream 1 Mode: FC&L Cycle Start Time: 11:04  
 Analyzer: 2350\_001 Strm Seq:1  
 Company: Daniel Industries

COMPONENT NAME	CAL CONC.	RAW DATA	NEW RF	RF % DEV.	NEW RT	RT % DEV.
C6+ 47/35/17	0.02890	0.00000	0.00000	0.00	0.0	0.00
PROPANE	1.00000	0.00000	0.00000	-98.58	0.0	2.19
i-BUTANE	0.30000	0.00000	0.00000	-85.27	0.0	0.61
n-BUTANE	0.30000	0.00000	0.00000	-86.02	0.0	-0.41
NEOPENTANE	0.10000	0.00000	0.00000	-90.53	0.0	0.58
i-PENTANE	0.09930	0.00000	0.00000	-43.33	0.0	-0.55
n-PENTANE	0.09990	0.00000	0.00000	-66.70	0.0	1.15
NITROGEN	2.50000	0.00000	0.00000	-98.80	0.0	0.87
METHANE	89.57190	0.00000	0.00000	-99.95	0.0	-1.18
CARBON DIOXIDE	1.00000	0.00000	0.00000	-94.66	0.0	-0.67
ETHANE	5.00000	0.00000	0.00000	-99.22	0.0	-2.79

MON2000 creates a temporary HTML file to display the generated report. If you want to save this report to disk, see [Section 7.1.4](#).


## NOTICE

The display refreshes per the update setting configured in the Report Display dialog (see [Section 7.4](#)).


For example, in the Report Display dialog, if Stream is set to "0-Current" and Update is set to "Any", the report display will refresh after the GC analyzes the stream selected via the Report Display dialog.

The refresh function displays the newly generated report and deletes the previous report (unless already saved to disk).

Check the GC status bar for the run time and current stream.

Use the scroll bars to see other areas of the report. Use the  button to increase or decrease the font size displayed.

See the following sections for instructions printing the displayed file or opening other report files from disk.

6. Click the  button or press the ESC key to exit this function and return to the Report Display dialog.

### 7.1.2 View Report from File

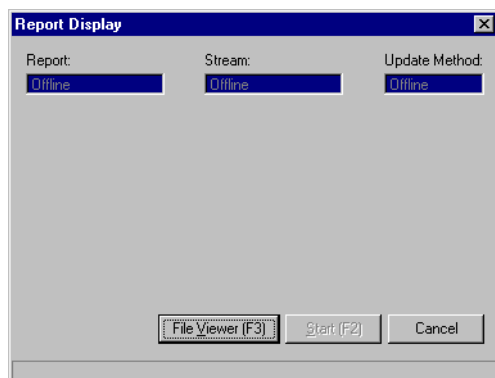
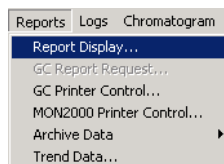
## NOTICE

Microsoft Internet Explorer 5.0 (or later) is required to view a report file in HTML format.

To open a report file for viewing,

1. Use the *Reports > Report Display* menu to access this function.
2. The Report Display dialog appears.

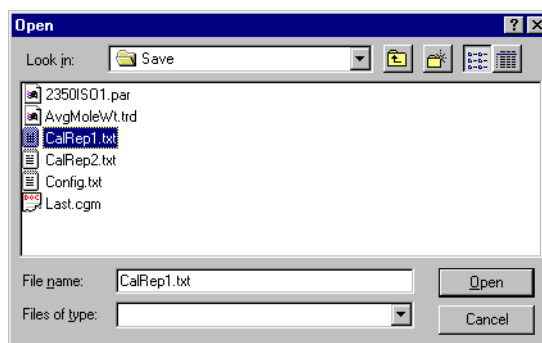
If you are working in off-line mode, the Report Display dialog will appear blank.



- Click the **File Viewer (F3)** button or press the F3 key to access the File Viewer dialog.



- Click the **Open** button. The Open dialog appears.

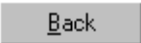



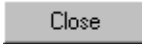
## NOTICE

By default, the Open dialog displays the c:\GC\Save directory.

- Use the provided directory tree to select the desired report file. Click the **Open** button.
- MON2000 opens the file and displays it in the File Viewer dialog.

Use the scroll bars to see other areas of the report. Use the **Font** button to increase or decrease the font size displayed.

Use the  and  buttons to browse through multiple report files.

7. Click the  button or press the ESC key to return to the Report Display dialog.


### 7.1.3 Print Report

To print a report,

#### **NOTICE**

The refresh function displays a newly generated report and deletes the currently displayed report (see [Section 7.1.1](#) for details).


You should print or save the current report immediately after it is displayed.

1. Display a live report or open a report file from disk. See [Section 7.1.1](#) or [Section 7.1.2](#) for details.
2. Click the  button.
3. MON2000 prints the report to your configured printer (see [Section 3.7](#)).

### 7.1.4 Save Report to Disk

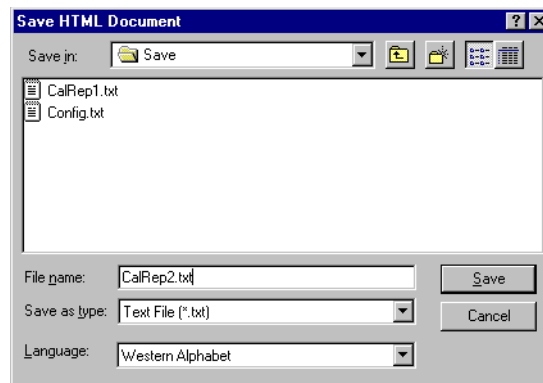
To save a report to disk,

1. Display a live report or open a report file from disk. See [Section 7.1.1](#) or [Section 7.1.2](#) for details.

2. Click the  button. The Save HTML Document dialog appears.

## NOTICE

MicroSoft Internet Explorer 5.0 (or later) is required to view a report file in HTML format.




3. Select the directory in which you want to save this report and type the desired name.

## NOTICE

You can save the report in any of these formats:

- .txt, ASCII Tab-delimited
- .csv, Comma-delimited
- .xls, Excel
- .htm, HTML
- .xml, EXTensible Markup Language

Note that the default location is **c:\GC\Save**.

4. Click the  button.

### 7.1.5 Report Contents

This section includes examples of the following reports: Analysis, Raw Data, Calibration, 24-Hour Average, Weekly Average, Hourly Average, and Variable Average. After each sample report, a table describes the contents and identifies which functions affect the data.

Each report contains the header information, including:

*Table 7-2 Contents Guide for Report Headers*

<b>Content</b>	<b>Related Function(s)</b>	<b>Menu</b>	<b>Section</b>
Date-Time	standard GC application	n/a	n/a
Analysis Time	Timed Events Table (TEV)	Application > Timed Events [F5]	<a href="#">5.3</a>
Cycle Time	TEV	Application > Timed Events [F5]	<a href="#">5.3</a>
Stream	Report Display, Select Stream	Reports > Report Display	<a href="#">7.1</a>
	Stream Name	Application > Streams	<a href="#">5.8</a>
Mode	standard GC application	n/a	n/a
Cycle Start Time	standard GC application	n/a	n/a
Analyzer	System, Analyzer Name	Application > System	<a href="#">5.1</a>
Strm Seq	System, Stream Sequence	Application > System	<a href="#">5.1</a>
Report Header (optional)	User Defined, Text Strings	Application > User Defined > Text Strings	<a href="#">5.4.3</a>

**Analysis Report**

Date-Time: 03/24/95 12:24 Analysis Time: 225 Cycle Time: 240  
 Stream: 3 Stream 3 Mode: ANLY Cycle Start Time: 12:20  
 Analyzer: AT401STD Strm Seq:1,2,3,4,5,6,7,8  
 Company: Daniel Industries, Houston, TX

Component Name	Mole Percent	Weight Percent	LiqVol Percent	Gallons/1000 SCF	BTU Gross	BTU Net	Relative Density
C6+ 47/35/17	0.0187	0.1076	0.0488	0.0083	0.99	0.92	0.0006
PROPANE	0.4922	1.3011	0.7918	0.1364	12.41	11.42	0.0075
i-BUTANE	0.0998	0.3477	0.1906	0.0326	3.25	3.00	0.0020
n-BUTANE	0.1017	0.3543	0.1872	0.0321	3.33	3.07	0.0020
NEOPENTANE	0.0493	0.2132	0.1102	0.0189	1.97	1.82	0.0012
i-PENTANE	0.0500	0.2162	0.1068	0.0183	2.01	1.85	0.0012
n-PENTANE	0.0502	0.2171	0.1062	0.0182	2.02	1.87	0.0013
NITROGEN	0.5624	0.9443	0.3599	0.0616	0.00	0.00	0.0054
METHANE	97.1656	93.4236	96.1229	16.4696	983.61	885.66	0.5382
CARBON DIOXIDE	0.3987	1.0518	0.3967	0.0679	0.00	0.00	0.0061
ETHANE	1.0114	1.8230	1.5789	0.2706	17.94	16.41	0.0105
TOTALS	100.0000	100.0000	100.0000	0.6649	1027.52	926.02	0.5761

'\*' indicates user-defined components

Compressibility Factor (1/Z) @ 14.730 PSIA & 60.0 DEG. F = 1.0021

Base Pressures	14.730	15.550	
Gross Dry BTU	= 1029.67	1086.99	Corrected/Z
Gross SAT BTU	= 1011.75	1068.08	Corrected/Z
Actual Gross BTU	= 1029.67	1086.99	Corrected/Z
Net Dry BTU	= 927.96	979.62	Corrected/Z
Net SAT BTU	= 911.81	962.57	Corrected/Z
Actual Net BTU	= 927.96	979.62	Corrected/Z
Total GPM C2+	= 0.6649	0.7020	
Total GPM C3+	= 0.3328	0.3513	
Total GPM C4+	= 0.1284	0.1356	
Real Relative Density Gas	= 0.5771		
Real Relative Density Lqd	= 0.3087		
WOBBE	= 1331.89		
Gas Density	= 44.143 lb/1000 cu.ft.		at 14.73 PSIA and 60 Deg.F
Liquid Density	= 2.572 lb/gal		
Reid Vapor Pressure	= 4867.46 PSIA		

User Defined Calculations

Label	Value
test	0.10
ACTIVE ALARMS	

*Table 7-3 Contents Guide for Analysis Report*

<b>Content</b>	<b>Related Function(s)</b>	<b>Menu</b>	<b>Section</b>
Component Name	Component Data Table (CDT)	Application > Component Data [F6]	<a href="#">5.2</a>
GC Analysis Data variables (std)	Calculations, Control	Application > Calculations > Control	<a href="#">5.5.1</a>
GC Analysis Data variables (user)	Calculations, User Defined	Application > Calculations > User Defined	<a href="#">5.5.3</a>
Alarms	Limit Alarms	Application > Limit Alarms	<a href="#">5.6</a>
Additional Base Pressures	Compress(ibility) enabled	Application > Calculations > Control	<a href="#">5.5.1</a>
	Streams, Optional Pressure	Application > Streams	<a href="#">5.8</a>



**Raw Data Report**

Date-Time: 03/24/95 12:24 Analysis Time: 225 Cycle Time: 240  
 Stream: 3 Stream 3 Mode: ANLY Cycle Start Time: 12:20  
 Analyzer: AT401STD Strm Seq: 1,2,3,4,5,6,7,8  
 Company: Daniel Industries, Houston, TX

No.	RETENTION TIME	PEAK AREA	PEAK HEIGHT	DET	MTHD	INTEGRATION START	INTEGRATION END	Peak Width Half Height
1	25.7	1640.	44.	1	2	24.0	26.5	0.7
2	29.0	24864.	409.	1	3	26.5	33.6	1.4
3	48.8	3.66064e+005	4707.	1	4	46.4	56.8	1.8
4	63.5	86164.	792.	1	2	59.5	68.0	2.5
5	71.5	90836.	737.	1	2	68.0	78.1	2.9
6	82.6	45000.	299.	1	3	78.1	90.3	3.6
7	105.7	49350.	261.	1	2	99.2	112.3	4.5
8	117.8	50382.	244.	1	3	112.3	127.7	4.9
9	145.6	2.4774e+005	4635.	1	2	142.9	148.6	1.3
10	150.1	3.50245e+007	3.2258e+005	1	3	148.6	167.8	2.7
11	177.6	2.0876e+005	1804.	1	1	173.1	189.4	2.8
12	203.6	5.87488e+005	3868.	1	1	196.6	215.6	3.7

*Table 7-4 Contents Guide for Raw Data Report*

Content	Related Function(s)	Menu	Section
Retention Time	standard GC application	n/a	n/a
Peak Area			
Peak Height			
Det(ector)			
Integration Start/End			
Peak Width 1/2 Height			
Mthd (method)	standard GC application, peak derivation method (non-edit)	Chromatogram Viewer	6.2.1

## Calibration Report

Calibration

Run 1 of 1

Date-Time: 03/24/95 12:28    Analysis Time: 225    Cycle Time: 240  
 Stream: 4    Stream 4    Mode: ANLY    Cycle Start Time: 12:24  
 Analyzer: AT401STD    Strm Seq:1,2,3,4,5,6,7,8  
 Company: Daniel Industries, Houston, TX

COMPONENT NAME	CAL CONC.	RAW DATA	NEW RF	RF % DEV.	NEW RT	RT % DEV.
C6+ 47/35/17	0.02000	24840.00000	1.242e+006	-9.07	29.0	0.35
PROPANE	0.50000	3.66212e+5	7.32424e+5	-4.24	48.8	0.00
i-BUTANE	0.10000	86320.00000	8.632e+005	-2.76	63.5	-0.31
n-BUTANE	0.10000	90784.00000	9.0784e+5	-1.16	71.5	-0.28
NEOPENTANE	0.05000	45084.00000	9.0168e+5	-3.90	82.6	-0.36
i-PENTANE	0.05000	48978.00000	9.7956e+5	-3.46	105.7	-0.56
n-PENTANE	0.05000	50064.00000	1.00128e+6	-2.99	117.8	-0.76
NITROGEN	0.60000	2.4768e+5	4.128e+005	-8.88	145.6	0.00
METHANE	97.13000	3.50394e+7	3.60747e+5	-2.69	150.1	-0.20
CARBON DIOXIDE	0.40000	2.09216e+5	5.2304e+5	-2.88	177.6	-0.17
ETHANE	1.00000	5.88496e+5	5.88496e+5	-1.49	203.6	0.25

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*Table 7-5 Contents Guide for Calibration Report*

Content	Related Function(s)	Menu	Section
Component Name Cal. Conc.	CDT	Application > Component Data [F6]	<a href="#">5.2</a>
Raw Data New RF RF % Dev. New RT RT % Dev.	CDT (additional columns)	Application > Component Data [F6]	<a href="#">5.2</a>
Alarms	Limit Alarms	Application > Limit Alarms	<a href="#">5.6</a>

### NOTICE

Streams used for analysis display "0"s in the calibration raw data columns (see [Section 5.8](#))

**Final Calibration Report**

Date-Time: 03/24/95 12:28    Analysis Time: 225    Cycle Time: 240  
 Stream: 4 Stream 4    MODE: ANLY    Cycle Start Time: 12:24  
 Analyzer: AT401STD    Strm Seq:1,2,3,4,5,6,7,8  
 Company: Daniel Industries, Houston, TX

Component Name	Cal Conc.	Old RF	New RF	* RF % DEV.	Old RT	New RT	* RT % DEV.
C6+ 47/35/17	0.03000	1.92126e+6	1.91453e+6	* -0.35	34.3	34.3	* -0.15
PROPANE	1.00300	1.11689e+6	1.11696e+6	* 0.01	50.8	50.8	* 0.00
i-BUTANE	0.30100	1.28687e+6	1.28641e+6	* -0.04	65.8	65.8	* 0.00
n-BUTANE	0.30200	1.32258e+6	1.32091e+6	* -0.13	73.5	73.4	* -0.07
NEOPENTANE	0.10000	1.39596e+6	1.39382e+6	* -0.15	86.0	86.0	* 0.06
i-PENTANE	0.09990	1.4712e+6	1.47663e+6	* 0.37	108.3	108.3	* 0.00
n-PENTANE	0.10000	1.51914e+6	1.52511e+6	* 0.39	120.2	120.2	* 0.00
NITROGEN	2.44300	726661.0000	726170.0000	* -0.07	145.1	145.1	* 0.00
METHANE	89.61810	585512.0000	585221.0000	* -0.05	149.4	149.4	* 0.00
CARBON DIOXIDE	1.00400	861074.0000	861836.0000	* 0.09	179.9	179.9	* 0.00
ETHANE	4.99900	953873.0000	953929.0000	* 0.01	207.2	207.1	* -0.02

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*Table 7-6 Contents Guide for Final Calibration Report*

Content	Related Function(s)	Menu	Section
Component Name Cal. Conc.	CDT	Application > Component Data [F6]	5.2
Old RF New RF RF % Dev. Old RT New RT RT % Dev.	standard GC application  results of final calibration, adjustments to response factors (RFs) and retention times (RTs)	Application > Component Data [F6]	5.2
	CDT (additional columns)		
Alarms	Limit Alarms	Application > Limit Alarms	5.6

**NOTICE**

Report items marked with an asterisk (\*) were updated during calibration.

## Average Reports

There are five types of Average Reports:

- Hourly Average Report
- 24-Hour Average Report
- Weekly Average Report
- Monthly Average Report
- Variable Average Report

### Sample 24-Hour Average Report

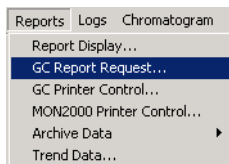
24 Hour Averages from Mon Apr 03 10:50:58 1995 Analyzer: AT401STD  
Company: Daniel Industries, Houston, TX

1	Mole Percent	S: 1 Stream 1	C: 1 C6+ 47/35/17		
	Start: Mon Apr 03 06:00:00 1995	Stop: Tue Apr 04 06:00:00 1995			
	Current	Average	Minimum	Maximum	Samples
		10.03610	2.25780	23.63960	8
1	Mon Apr 03 06:00:00 1995	0.20443	0.01870	2.43300	37
2	Sun Apr 02 07:00:00 1995	0.01918	0.01900	0.01940	39
3	Sat Apr 01 06:00:00 1995	0.01918	0.01900	0.01940	38
2	Mole Percent	S: 1 Stream 1	C: 2 PROPANE		
	Start: Mon Apr 03 06:00:00 1995	Stop: Tue Apr 04 06:00:00 1995			
	Current	Average	Minimum	Maximum	Samples
		0.00000	0.00000	0.00000	8
1	Mon Apr 03 06:00:00 1995	3.74130	0.00000	4.79480	37
2	Sun Apr 02 07:00:00 1995	4.78225	4.77260	4.79290	39
3	Sat Apr 01 06:00:00 1995	4.78240	4.77300	4.78990	3824
•					
•					
•					
13	Net Heating Value (Dry)	S: 1 Stream 1			
	Start: Mon Apr 03 06:00:00 1995	Stop: Tue Apr 04 06:00:00 1995			
	Current	Average	Minimum	Maximum	Samples
		2551.31000	1403.71000	4175.43000	8
1	Mon Apr 03 06:00:00 1995	1024.18000	906.22600	1647.33000	37
2	Sun Apr 02 07:00:00 1995	988.18100	988.03000	988.36700	39
3	Sat Apr 01 06:00:00 1995	988.18600	988.03300	988.30000	38

Table 7-7 Contents Guide for Average Reports

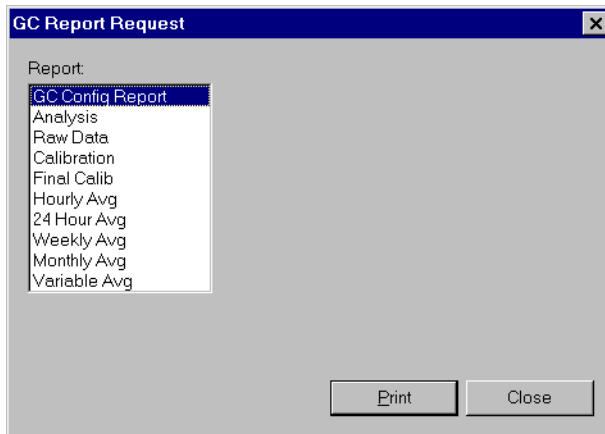
Content	Related Function(s)	Menu	Section
Item Number Analysis data/calcula- tion Stream Component	Calculations, Averages	Application > Calculations > Averages	5.5.2
Old RF New RF RF % Dev. Old RT New RT RT % Dev.	standard GC application  results of ongoing or completed averages	n/a	n/a

## 7.2 GC REPORT REQUEST



This function allows you to send a report to a printer connected to the GC Controller.

1. Use the *Reports > GC Report Request* menu to access this function.
2. The GC Report Request dialog appears.



3. Select the report you wish to print.

## NOTICE


The GC Config Report is a snapshot of the PC Config Report. Contents include:

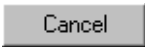
- current alarms
- streams
- control calculations
- CDTs
- TEVs
- GC serial port settings
- analog outputs

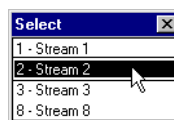
See [Appendix A](#) for a sample PC Config Report.

For reports other than the GC Config, a Streams list displays.

Double-click the appropriate stream and the controller sends the report to the printer.

Click the  button. Double-click the appropriate stream and the print process begins.

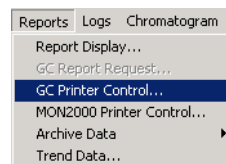
Click the  button to abort and return to the main window.



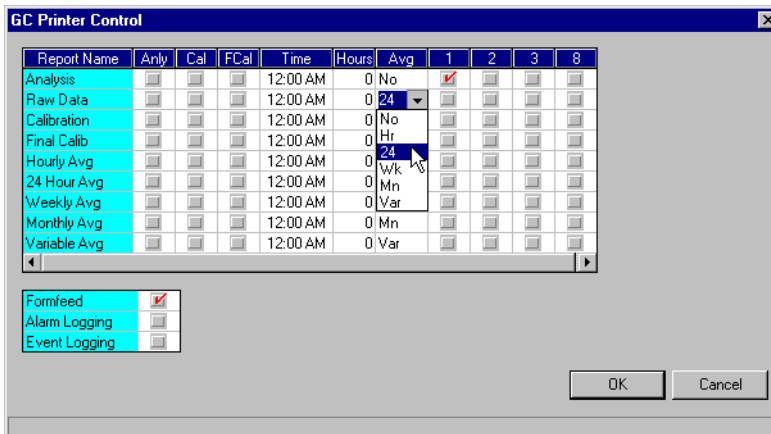
### 7.3 GC PRINTER CONTROL

This function allows you to define schedules for automatic printing of standard GC reports to a printer connected to the GC Controller.

1. Use the *Reports > GC Printer Control* menu to access this function.




2. The GC Printer Control dialog displays.



**NOTICE**

You can, for example, set a report to print after each analysis and every 12 hours.

- Use the provided data fields, check and combo boxes to select the desired settings. See Table 7-8 for detailed descriptions.
- Click the  button to accept your selections and return to the main window.

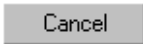
Click the  button to abort and return to the main window.

Table 7-8 Description of Settings for GC Printer Control

Setting	Description
Any	Enables/disables report printing after each analysis run regardless of report type selected.
Cal	Enables/disables report printing after each calibration run regardless of report type selected.
FCal	Enable/disable report printing after every final calibration run regardless of report type selected.

**Time** Time at which report should print at 24-hour intervals.  
 To disable this feature, set Time to **00:00** or **12:00 AM**.  
 The Time setting overrides the Hours setting and only applies to streams that are enabled (i.e., checked ON) for report printing.

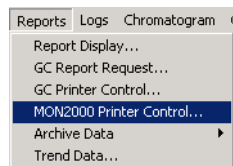
Table 7-8 Description of Settings for GC Printer Control (Continued)

Setting	Description
Hours	hour interval at report should print  Use this setting for intervals less than 24 hours. For example, use this setting if you wish to print a report every 8 hours. Ensure that the Time value is “00:00” to disable the 24-hour setting or “12:00 AM” to disable the 12-hour setting.  This setting only applies to streams enabled (i.e., checked ON) for report printing.
Avg	average type to be used in the report calculations; calculations are dependent on settings in the Averages Calculations dialog (see <a href="#">Section 5.5.2</a> )  No = disabled Hr = hourly avg 24 = 24-hour avg Wk = weekly avg Mn = monthly avg Var = variable avg
<numbered columns>	streams to be used for data collection when the report is generated
Form Feed	enable/disable manual paper feed feature of printer
Alarm Logging	enable/disable real-time printing of alarms as they occur
Event Logging	enable/disable real-time printing of events as they occur

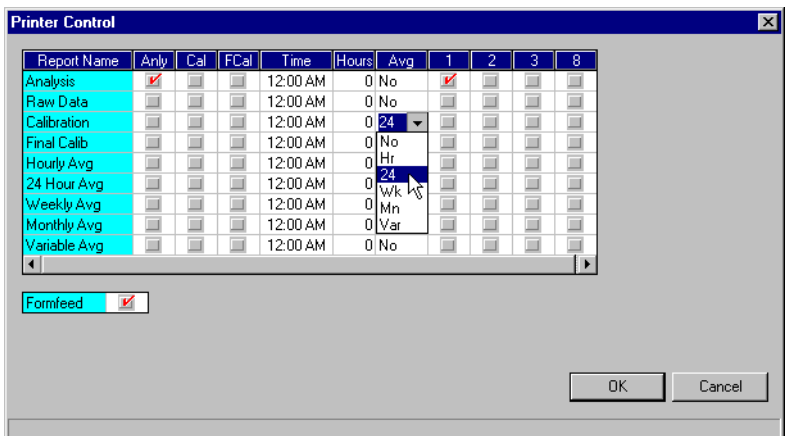
## 7.4 MON2000 PRINTER CONTROL

This function allows you to define schedules for automatic printing of standard GC reports to a printer connected to your PC. See [Section 3.7](#) to configure the printer settings. The user must be on-line (connected to the controller) using either a serial port direct connection, modem or Ethernet card in order to print from the MON2000 printer.





1. Use the *Reports > MON2000 Printer Control* menu to access this function.
2. The Printer Control dialog displays.

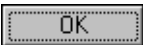


**NOTICE**

You can, for example, set a report to print after each analysis and every 12 hours.

Each report generation interrupts all current functions.

Use the provided data fields, check and combo boxes to select the desired settings. See Table 7-9 for detailed descriptions.

3. Click the  button to accept your selections and return to the main window.

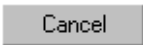
Click the  button to abort and return to the main window.

Table 7-9 Description of Settings for MON2000 Printer Control

Setting	Description
Anly	enable/disable report printing after each analysis run regardless of report type selected
Cal	enable/disable report printing after each calibration run regardless of report type selected
FCal	enable/disable report printing after every final calibration run regardless of report type selected
Time	time at which report should print (every 24 hours)  00:00 = disables 24-hour setting 12:00 AM = disables 12-hour setting

Note that the Time setting will override the Hours setting.

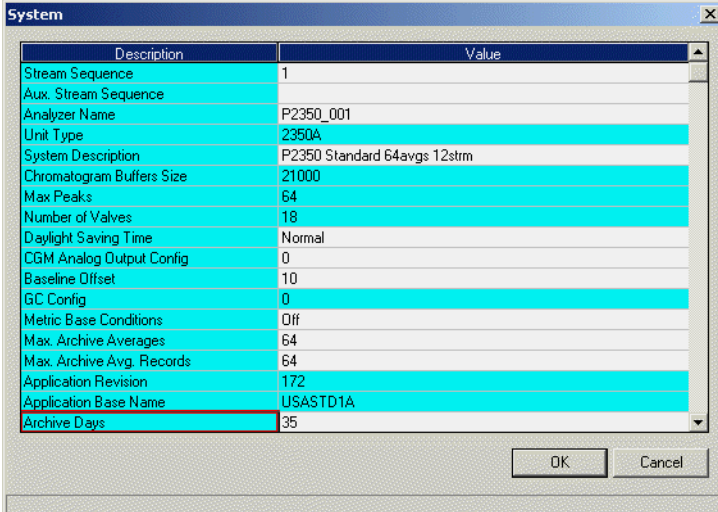
Table 7-9 Description of Settings for MON2000 Printer Control (Continued)

Setting	Description
Hours	hour interval at report should print  Use this setting for intervals less than 24 hours. For example, use this setting if you wish to print a report every 8 hours. Ensure that the Time value is "00:00" to disable the 24-hour setting or "12:00 AM" to disable the 12-hour setting.
Avg	average type to be used in the report calculations; calculations are dependent on settings in the Averages Calculations dialog ( <a href="#">see Section 5.5.2</a> )  No = disabled Hr = hourly avg 24 = 24-hour avg Wk = weekly avg Mn = monthly avg Var = variable avg
<number red columns >	streams to be used for data collection when the report is generated
Form Feed	enable/disable manual paper feed feature of printer

## 7.5 ARCHIVE DATA

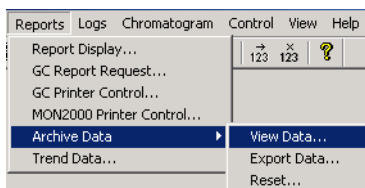
This function enables you to view, print, or save various reports and records stored in the GC memory for the Model 500 and Model 700 analyzers. You can also reset (i.e., delete) the stored records from the GC memory.

The standard GC application can store up to ninety-nine days of analysis runs and calibration records.



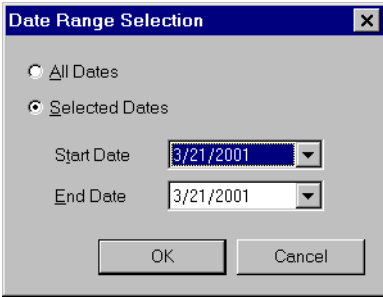
Description	Value
Stream Sequence	1
Aux. Stream Sequence	
Analyzer Name	P2350_001
Unit Type	2350A
System Description	P2350 Standard 64avgs 12stm
Chromatogram Buffers Size	21000
Max Peaks	64
Number of Valves	18
Daylight Saving Time	Normal
CGM Analog Output Config	0
Baseline Offset	10
GC Config	0
Metric Base Conditions	Off
Max. Archive Averages	64
Max. Archive Avg. Records	64
Application Revision	172
Application Base Name	USASTD1A
Archive Days	35

### 7.5.1 View Data Model 500/Model 700



To view, print, copy or save archived data,

1. Use the *Reports > Archive Data > View Data* menu to access this function.
2. MON2000 displays the Date Range Selection pop-up dialog.



**Date Range Selection**

All Dates  
 Selected Dates

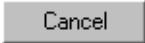
Start Date: 3/21/2001  
 End Date: 3/21/2001

OK Cancel

Select **All Dates** radio button or choose **Selected Dates**. Select the Start date and End Date (date range) for the report to be archived.

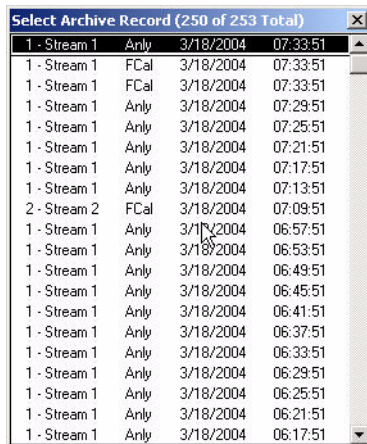
3. Click the  button to apply your selection.

Or,

Click the  button to return to the View Data window.

MON2000 displays the message “Reading GC Data” in the status bar.

4. The Select Archive Record dialog appears.



Stream	Type	Date	Time
1 - Stream 1	Anly	3/18/2004	07:33:51
1 - Stream 1	FCal	3/18/2004	07:33:51
1 - Stream 1	Anly	3/18/2004	07:29:51
1 - Stream 1	Anly	3/18/2004	07:25:51
1 - Stream 1	Anly	3/18/2004	07:21:51
1 - Stream 1	Anly	3/18/2004	07:17:51
1 - Stream 1	Anly	3/18/2004	07:13:51
2 - Stream 2	FCal	3/18/2004	07:09:51
1 - Stream 1	Anly	3/18/2004	06:57:51
1 - Stream 1	Anly	3/18/2004	06:53:51
1 - Stream 1	Anly	3/18/2004	06:49:51
1 - Stream 1	Anly	3/18/2004	06:45:51
1 - Stream 1	Anly	3/18/2004	06:41:51
1 - Stream 1	Anly	3/18/2004	06:37:51
1 - Stream 1	Anly	3/18/2004	06:33:51
1 - Stream 1	Anly	3/18/2004	06:29:51
1 - Stream 1	Anly	3/18/2004	06:25:51
1 - Stream 1	Anly	3/18/2004	06:21:51
1 - Stream 1	Anly	3/18/2004	06:17:51

Double-click the desired archived report or record. (If no records are found, an information dialog displays.) Select a range (multiple) of records to archive by left-clicking the mouse at the beginning record and dragging the pointer to the last record to be archived. Then, press the **ENTER** key.

Or,

Left-click the mouse pointer on the beginning record, then move the mouse pointer to another location (either further up or down the list) and while holding down the **Shift** key, click the ending record. All highlighted records will be automatically selected. Press the **Enter** key to display all of the selected records.

## NOTICE

**MON2000 limits the number of viewable Archived Records to 100.**



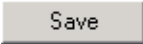
5. The Calculation Results from Ext. Modbus window appears.

	A	B	C	D	E	F
1	Ext. Modbus stream 1 on 6/9/2005 7:39:08 AM					
2						
3		MolPct	WgtPct	Gal/1000	BTUGross	RelDens
4	C6+ 50/50/00	0.0109	0.0408	0.0048	0.56	0.0004
5	PROPANE	0.1217	0.2149	0.0335	3.07	0.0019
6	i-BUTANE	0.0227	0.0529	0.0074	0.74	0.0005
7	n-BUTANE	0.0000	0.0000	0.0000	0.00	0.0000
8	NEOPENTANE	85.4 PPM	0.0247	0.0033	0.34	0.0002
9	i-PENTANE	0.0112	0.0323	0.0041	0.45	0.0003
10	n-PENTANE	0.0000	0.0000	0.0000	0.00	0.0000
11	NITROGEN	73.4412	82.4195	0.0000	0.00	0.7104
12	METHANE	26.0415	16.7361	0.0000	263.63	0.1443
13	CARBON DIOXIDE	0.1190	0.2097	0.0000	0.00	0.0018
14	ETHANE	0.2234	0.2691	0.0597	3.96	0.0023
15	TOTAL	100.0000	100.0000	0.1128	272.75	0.8619
16						
17	Compressibility Factor	1.0007				
18	Heating Value Gross BTU Dry	272.30				
19	Heating Value Gross BTU Sat.	267.56				
20	Heating Value Gross BTU Act.	272.30				
21	Relative Density Gas Corr.	0.8621				
22	Gallons/1000 SCF C3+	0.0530				
23	Total Unnormalized Conc.	82.477				
24	Avg. Molecular Weight	24.9614				

Use the button or press the ESC key to exit this function and return to the main window.

As applicable, use the scroll bars to see other areas of the record.

- To print, copy to the clipboard, or save the report to disk, right-click the Archive Data sheet and select the desired option from the popup menu.

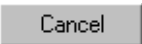
Or, use the ,  or  buttons for these functions.

Use the Save File dialog to choose the directory location and file name.

## NOTICE

You can save the report in any of these formats:

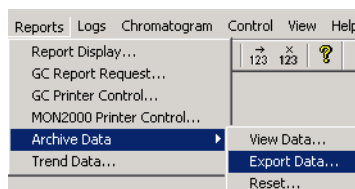
- .txt, ASCII Tab-delimited
- .csv, Comma-delimited
- .xls, Excel
- .htm, HTML
- .xml, EXtensible Markup Language

- Click the  button to return to the main window.

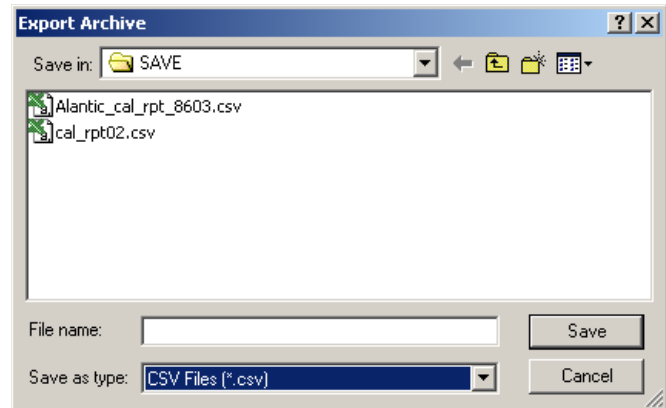
### 7.5.2 Archive Export Data

Use this function to export data files for review at a later time.

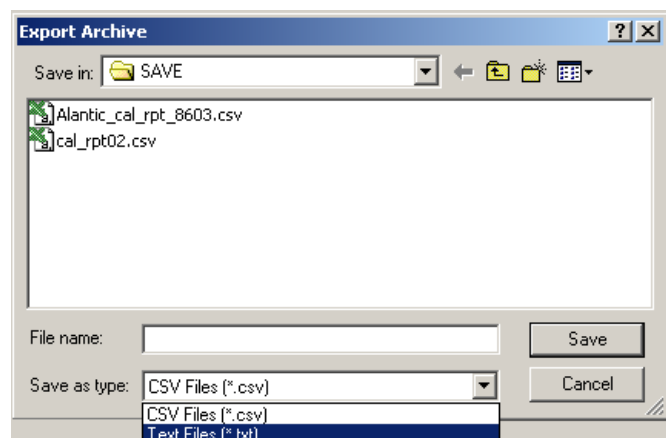
From the *Reports>Archive Data>Export Data* menu,



1. Click Export Data and the Export Archive window displays.



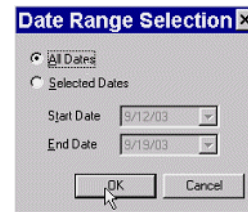
2. The exported data file is saved in the default (GC>Directory). Use the pull-down menu to save the data file to a different directory.
3. Click an existing file (to write over an existing file) or enter a 'new' file name in the 'Data Field'.
4. Save the file as either:
  - .csv (spreadsheet application format)
  - .txt (Word Pad or Note Pad application format)



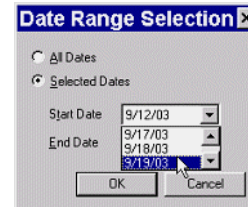
If the GC you are using is a Model 2350A, the 'Data Selection Range' dialog appears. Choose the date range as:

- All dates (radio button) or,
- Selected Dates (radio button)
- Start date
- End date


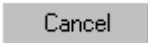
Also note that the Date Range dialog only displays when files are archived for more than one day.



Default Settings



Date Range Selection

5. Click the  button to apply your selection. Click the  button to abort and return to the Trend Data window.
6. The Select Archive Records dialog appears.

Stream	File	Date	Time
7 - Stream 7	Anly	9/19/03	14:37:13
5 - Stream 5	Anly	9/19/03	14:33:13
1 - Stream 1	Anly	9/19/03	14:29:13
11 - Stream 11	Anly	9/19/03	14:25:13
7 - Stream 7	Anly	9/19/03	14:21:13
5 - Stream 5	Anly	9/19/03	14:17:13
1 - Stream 1	Anly	9/19/03	14:13:13
11 - Stream 11	Anly	9/19/03	14:09:13
7 - Stream 7	Anly	9/19/03	14:05:13
5 - Stream 5	Anly	9/19/03	14:01:13
1 - Stream 1	Anly	9/19/03	13:57:13
11 - Stream 11	Anly	9/19/03	13:53:13
7 - Stream 7	Anly	9/19/03	13:49:13
5 - Stream 5	Anly	9/19/03	13:45:13
1 - Stream 1	Anly	9/19/03	13:41:13
11 - Stream 11	Anly	9/19/03	13:37:13
7 - Stream 7	Anly	9/19/03	13:33:13
5 - Stream 5	Anly	9/19/03	13:29:13
1 - Stream 1	Anly	9/19/03	13:25:13
11 - Stream 11	Anly	9/19/03	13:21:13

Select Archive Record Default

Stream	File	Date	Time
7 - Stream 7	Anly	9/19/03	14:37:13
5 - Stream 5	Anly	9/19/03	14:33:13
1 - Stream 1	Anly	9/19/03	14:29:13
11 - Stream 11	Anly	9/19/03	14:25:13
7 - Stream 7	Anly	9/19/03	14:21:13
5 - Stream 5	Anly	9/19/03	14:17:13
1 - Stream 1	Anly	9/19/03	14:13:13
11 - Stream 11	Anly	9/19/03	14:09:13
7 - Stream 7	Anly	9/19/03	14:05:13
5 - Stream 5	Anly	9/19/03	14:01:13
1 - Stream 1	Anly	9/19/03	13:57:13
11 - Stream 11	Anly	9/19/03	13:53:13
7 - Stream 7	Anly	9/19/03	13:49:13
5 - Stream 5	Anly	9/19/03	13:45:13
1 - Stream 1	Anly	9/19/03	13:41:13
11 - Stream 11	Anly	9/19/03	13:37:13
7 - Stream 7	Anly	9/19/03	13:33:13
5 - Stream 5	Anly	9/19/03	13:29:13
1 - Stream 1	Anly	9/19/03	13:25:13
11 - Stream 11	Anly	9/19/03	13:21:13

Select Archive Record Selection

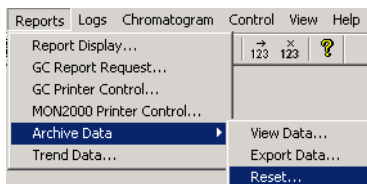
To Select all records, the operator may drag the slide bar down to the end of the list, then while holding down the 'Shift' key click the last report and MON2000 will automatically select all records in between. This also works for any number of records within the list.



The operator may select several records individually by holding down the 'Ctrl' key and clicking the mouse pointer on random selected reports. Reports that are several hours apart may be viewed in this manner.

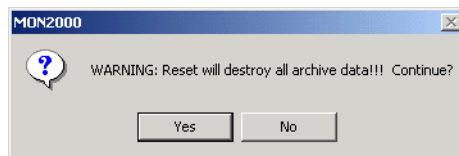
Or, as the example .BMP above shows, the operator may click a report and drag the mouse pointer down, highlighting several reports in sequential order.


### 7.5.3 Reset



To delete archived data and reset the GC Controller memory,

1. Use the *Reports > Archive Data > Reset* menu to access this function.
2. MON2000 displays a confirmation dialog.




Click the  button to continue.

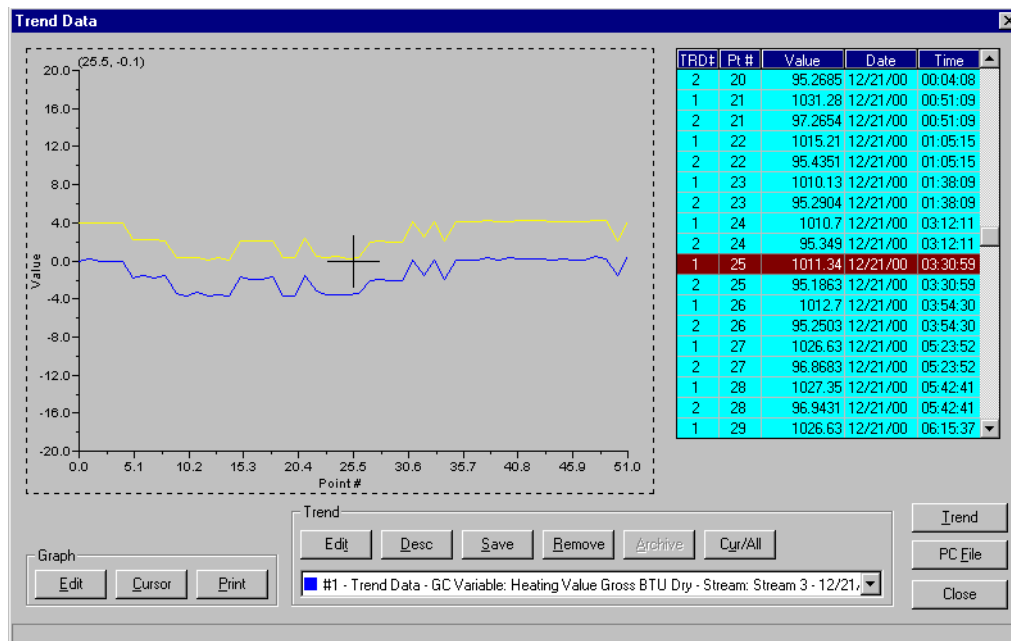
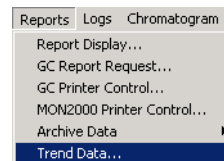
3. MON2000 clears the GC Controller memory. New archived records will begin accumulating again as analysis and calibration runs occur.

## 7.6 TREND DATA

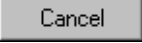
This function allows you to view, print, or save graphical representations, or trend lines, of accumulated analysis data for the 2350A and the Model 700 GC Controllers.

### 7.6.1 Trend Data Model 700/2350A GCs

1. Use the *Reports > Trend Data* menu, then click the  button to access this function.
2. The Trend Data dialog appears.



Use the enabled Graph and Trend push-buttons to access the Trend Data features. See the following sections for detailed information.

3. Click the  button to return to the main window.

## 7.6.2 View Live Trend Online Model 700/2350A

To view a live trend from the online Model 700/2350A GC,

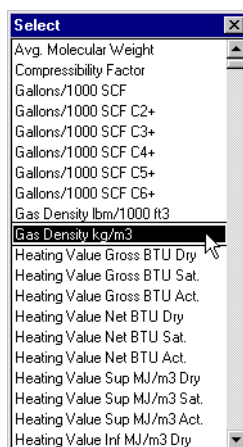
### NOTICE

You cannot view a live trend if the corresponding analysis record does not exist in the GC memory.

An error message will display:

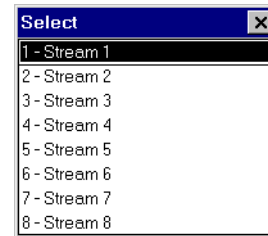
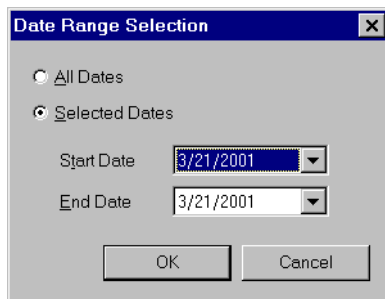


1. Click the **Trend** button.
2. The Select menu for variable displays.



Double-click the desired variable. If the selected variable applies to a single component (e.g., Gallons/1000 SCF, Liquid Volume Percent, or Mole Percent), then the Standard Components menu appears.

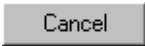
- The Select menu for streams appears. Double-click the left mouse button on the desired stream to make your selection.
- MON2000 displays the Date Range Selection pop-up dialog.



Select **All Dates** radio button or choose **Selected Dates**. From the pull-down menu, select the date range for the Trend report.

Click the  to apply your selection.

Or,

Click the  button to return to the trend window.

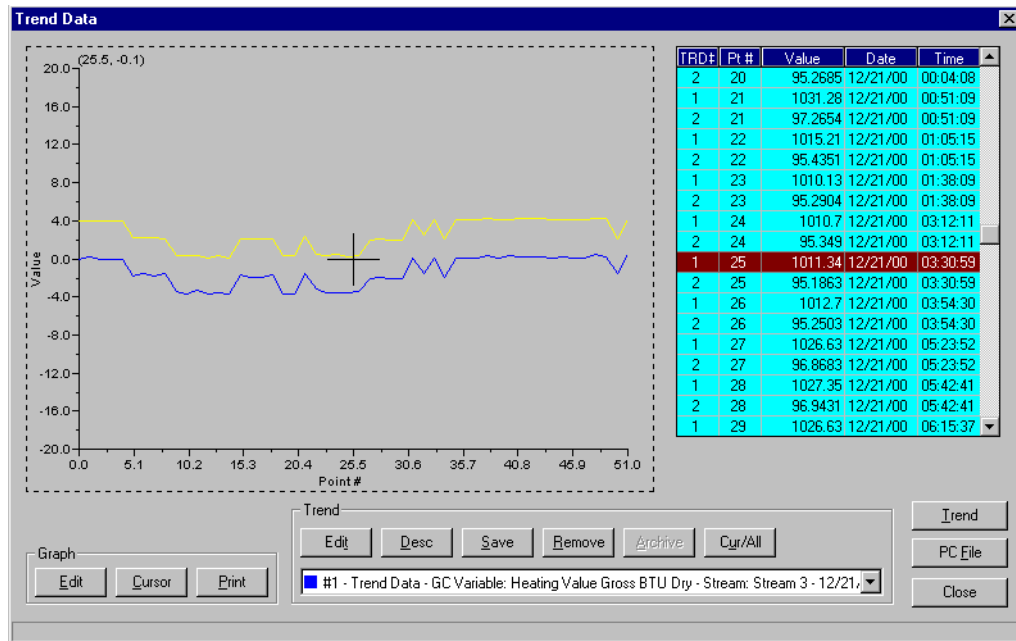
- MON2000 reads data from the online GC unit and plots the current, live trend for the selected component and stream.

### CAUTION

Plotting a trend line interrupts the normal storage of ongoing Auto Sequence analysis results.

A trend line graph generated from the maximum 1200 archived analysis records can require up to 8 minutes to plot. Any Auto Sequence analysis that occurs during the plotting will not be retained for future retrieval nor will be included in ongoing calculations.

The Trend Data window appears.




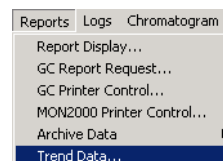
The corresponding data is dynamically displayed in the provided legend.

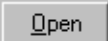

Use the Graph and Trend Options functions to manipulate the display. To zoom in on a particular point, click and drag your mouse over that area; repeat as necessary. Use the Restore State or Zoom Out options from the right-click menu (see Section 7.6.10) to return to the original display.

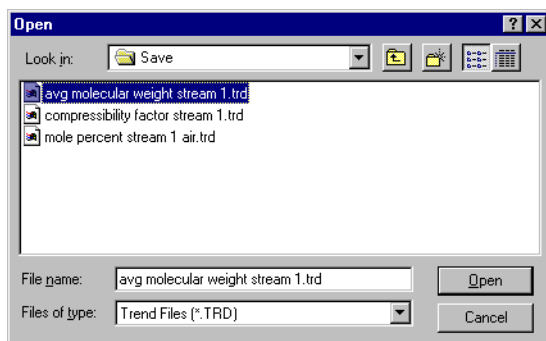
TRD#	Pt #	Value	Date	Time
2	20	95.2685	12/21/00	00:04:08
1	21	1031.28	12/21/00	00:51:09
2	21	97.2654	12/21/00	00:51:09
1	22	1015.21	12/21/00	01:05:15
2	22	95.4351	12/21/00	01:05:15
1	23	1010.13	12/21/00	01:38:09
2	23	95.2904	12/21/00	01:38:09
1	24	1010.7	12/21/00	03:12:11
2	24	95.349	12/21/00	03:12:11
1	25	1011.34	12/21/00	03:30:59
2	25	95.1863	12/21/00	03:30:59
1	26	1012.7	12/21/00	03:54:30
2	26	95.2503	12/21/00	03:54:30
1	27	1026.63	12/21/00	05:23:52
2	27	96.8683	12/21/00	05:23:52
1	28	1027.35	12/21/00	05:42:41
2	28	96.9431	12/21/00	05:42:41
1	29	1026.63	12/21/00	06:15:37

### 7.6.3 View Trend from File on Disk

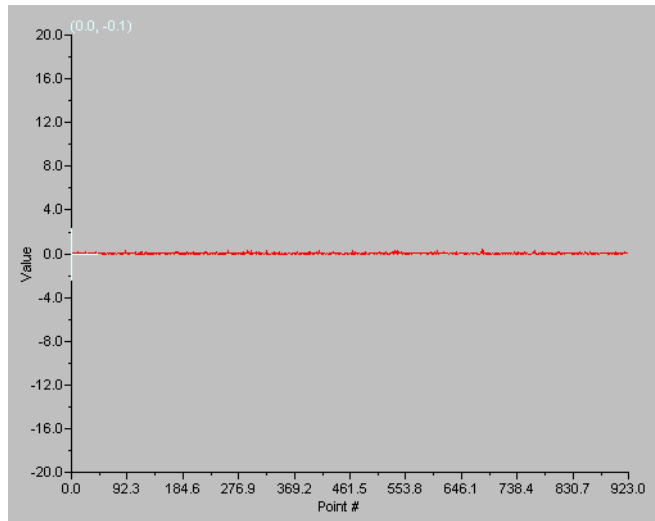
To view a trend from a file previously saved to disk, use the *Reports > Trend Data* menu, then click the  button to access this function.



1. Click the  button.
2. Use the provided directory tree to locate the desired TRD file and click the  button to open.



3. MON2000 displays the trend file.




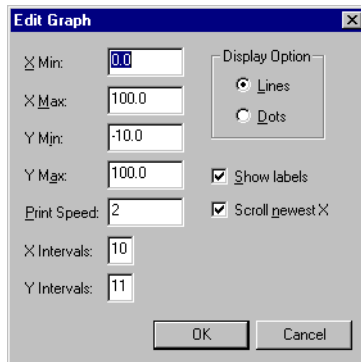
Pt #	Value	Date	Time
0	1.0381946	9/26/1999	1:20:27 AM
1	0.0417453	9/26/1999	1:24:29 AM
2	1.0123129	9/26/1999	1:28:32 AM
3	0.0946715	9/26/1999	1:32:34 AM
4	1.0798518	9/26/1999	1:36:36 AM
5	0	9/26/1999	1:40:39 AM
6	1.0982002	9/26/1999	1:44:41 AM
7	0	9/26/1999	1:48:44 AM
8	0.0585657	9/26/1999	1:52:46 AM
9	0	9/26/1999	1:56:48 AM
10	0	9/26/1999	2:00:51 AM
11	0.124345	9/26/1999	2:04:53 AM
12	0.0557224	9/26/1999	2:08:56 AM
13	0	9/26/1999	2:12:58 AM
14	1.0510376	9/26/1999	2:17:00 AM
15	1.0288593	9/26/1999	2:21:03 AM
16	0	9/26/1999	2:25:05 AM
17	0	9/26/1999	2:29:08 AM


The corresponding data is dynamically displayed in the provided legend.

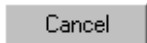
Use the Graph and Trend Options functions to manipulate the display. To zoom in on a particular point, click and drag your mouse over that area; repeat as necessary. Use the Restore State or Zoom Out options from the right-click menu (see Section 7.6.10) to return to the original display.

### 7.6.4 Edit Graph Display

1. Click the  button. The Edit Graph dialog appears.

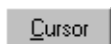


2. Use the provided attributes and options to change the trend display as desired.
3. Click the  button to accept your changes and return to the Trend Data dialog.

Click the  button to abort and return to the Trend Data dialog.


4. The trend display changes as specified.  
Additional display options are available by right-clicking the display area. [See Section 7.6.10](#) for more information.

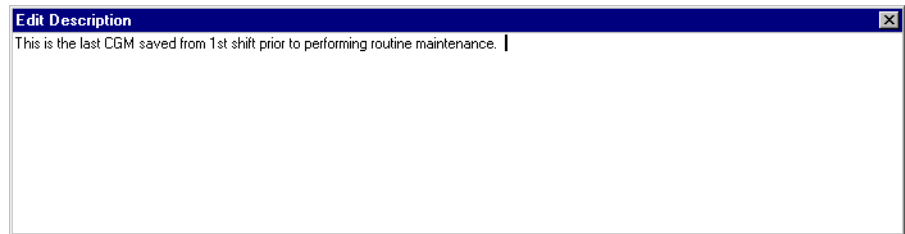
### 7.6.5 Changing Cursor Size

To toggle the cursor size from course movement (less accurate) to fine movement (more accurate), click the  button.




### 7.6.6 Describe Trend


1. Click the  button. The Edit Description dialog appears.



2. Type the desired statement(s).
3. Press the ENTER key to save this description.

Use the  button or press the ESC key to exit this dialog without saving your entry.

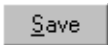
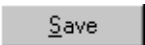
### 7.6.7 Print Trend

To print the displayed trend graph, click the  button.

MON2000 prints the report to your configured printer (see [Section 3.7](#)).

### 7.6.8 Save Trend

To save a currently displayed trend to disk,

1. Click the  button.
2. Use the provided directory tree to select the desired file location and name, then click the  button.
3. MON2000 saves the trend along with its graph settings.

## NOTICE

The table is saved as a binary file with a .trd extension.

### 7.6.9 Read Trend Archive

This feature is not available if the corresponding analysis record does not exist in the GC memory or if you are viewing this trend data offline from a file.

To read the Trend Archive,

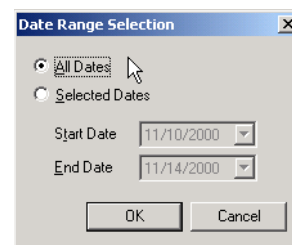
1. Click the  button.

If you are operating a Model 700 or 2350A GC, then an Archive Range Selection dialog displays.

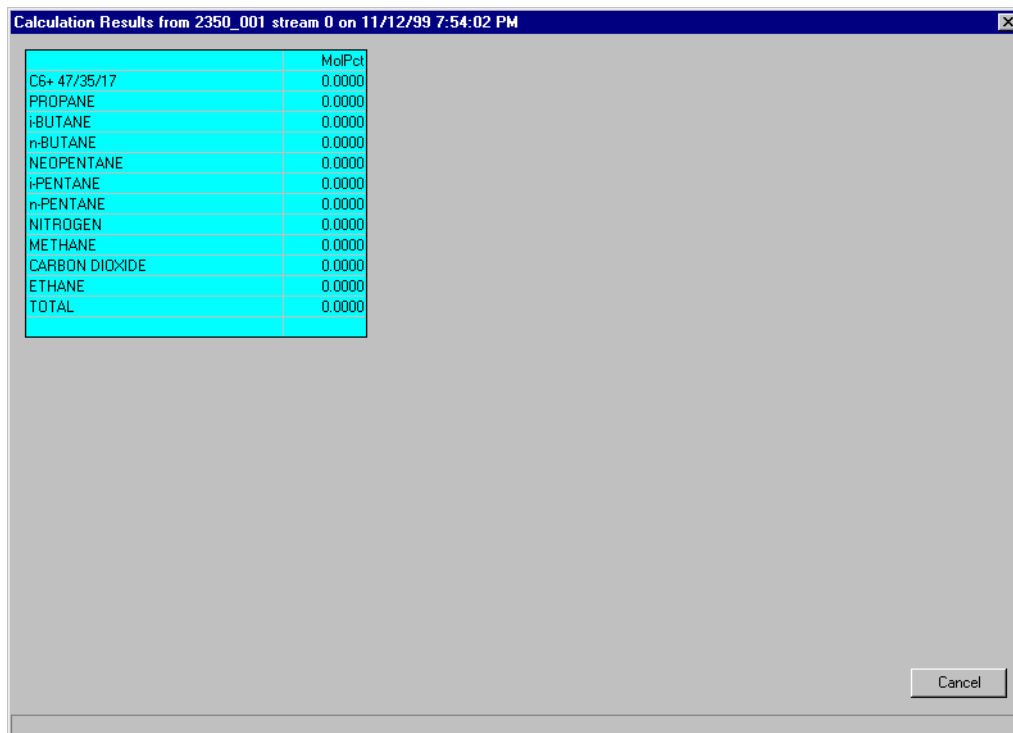
- (a) Toggle the appropriate radio button to select either *All Dates* or *Selected Dates*.

To specify a date range, use the *Start Date* and *End Date* pull-down menus.

- (b) Click the  button to continue.



2. The Archive dialog appears.



	MolPct
C6+ 47/35/17	0.0000
PROPANE	0.0000
i-BUTANE	0.0000
n-BUTANE	0.0000
NEOPENTANE	0.0000
i-PENTANE	0.0000
n-PENTANE	0.0000
NITROGEN	0.0000
METHANE	0.0000
CARBON DIOXIDE	0.0000
ETHANE	0.0000
TOTAL	0.0000

3. Click the  button to return to the Trend Data dialog.

### 7.6.10 Display Options

Right-click the graph area to access these options, or use the corresponding keystroke(s). Options are listed in alphabetical order.

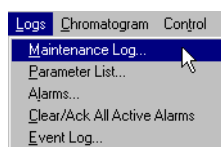
Table 7-10 Display Options for Trend Data

<b>Keystroke</b>	<b>Right-Click Option</b>	<b>Description</b>
CTRL C	Copy to clipboard	allows you to copy this graph to another application such as MS Word or Excel
F8	Cursor to nearest point	snap cursor to nearest point in both the X and Y directions
CTRL V	Paste from clipboard	allows you to plot a range of points from another application such as Meshwork or Excel
CTRL P	Print Plot Area	print currently displayed chromatograph area
CTRL S	Print Series All	print all displayed chromatograms
HOME	Restore State	restore last saved display settings for the selected chromatogram
CTRL HOME	Save State	save current display settings for the selected chromatogram
F4	Toggle Coarse/Fine	toggle cursor from coarse (less accurate) to fine (more accurate)
F9	Toggle Lines/Dots	toggle graph from line(s) to dots
CTRL F4	Toggle Mouse Position Tip	graph cursor follows movement of mouse while tooltip displays exact coordinates of the current point
CTRL F9	Toggle Nearest Point Tip	graph cursor follows movement of mouse cursor
NUM +	Zoom In	zoom in on entire graph
NUM -	Zoom Out	zoom out from entire graph
NUM →	Zoom X In	zoom in on X axis
NUM ←	Zoom X Out	zoom out from X axis
NUM ↑	Zoom Y In	zoom in on Y axis
NUM ↓	Zoom Y Out	zoom out from Y axis

## LOGS

The options in the Logs pull-down menu allows you to keep a maintenance record, keep a parameter record, and view the Alarm and Event Logs.

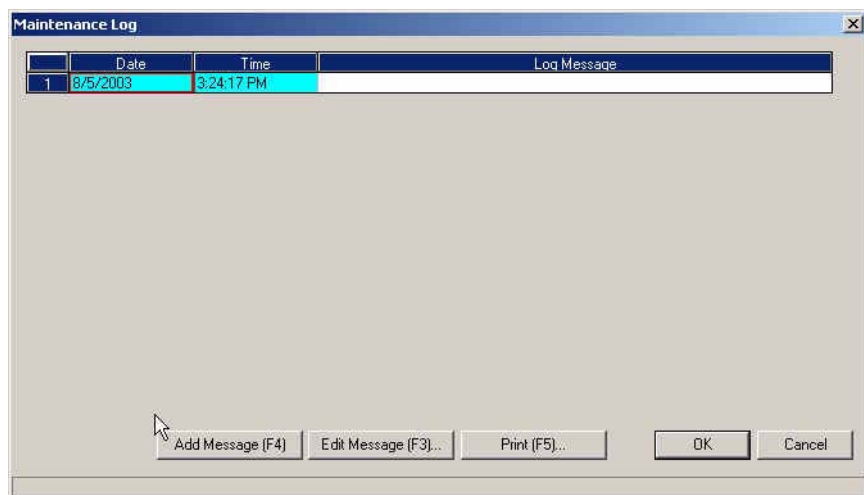
### 8.1 MAINTENANCE LOG



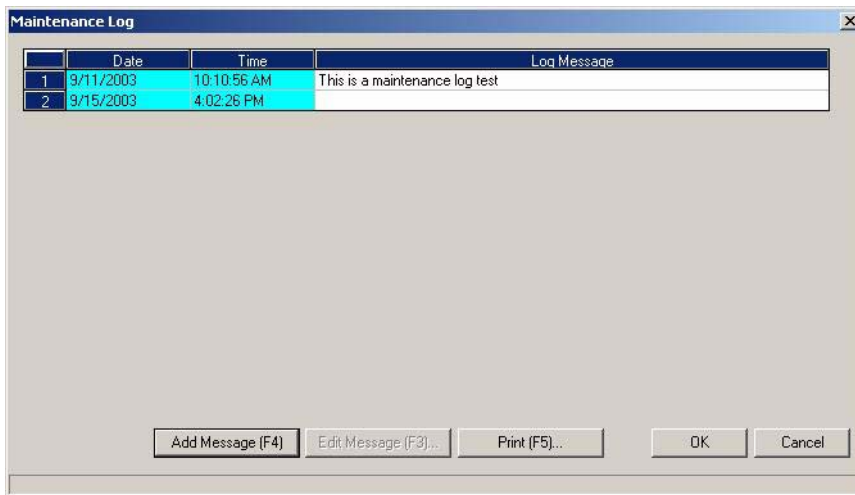
Use this function to track maintenance activities performed on a given GC unit.


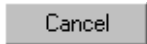

To read and edit the Maintenance Log,

1. Use the *Logs > Maintenance Log* menu to access this function. MON2000 retrieves the data from the GC unit.
2. The Maintenance Log dialog appears.



3. To add the log entry text,
  - (a) Click the “Add Message F4” button or click the last ‘Log Message’ cell and press the RETURN key. The Maintenance Log message dialog displays.




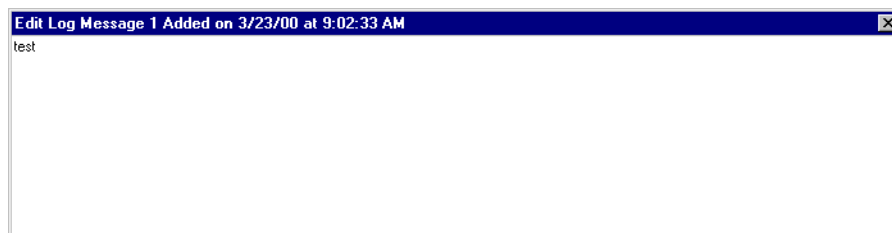
- (b) Add text in the appropriate *Log Message* cell, then click the  button to apply the changes. Click the  button to discard your changes and return to the Main window.
4. To change the log entry text,
  - (a) Click the appropriate *Log Message* cell.
  - (b) Click the  button. The Edit Log Message dialog appears.
  - (c) Type your edits.


## NOTICE

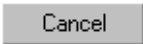
A Log Message can contain up to 1000 characters.

However, the entire Maintenance Log can contain no more than 1100 characters.

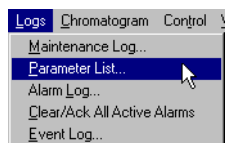
- (d) To accept your edits, press the RETURN key. To cancel your edits, click the  button or press the ESC key.



5. To delete a log entry, click the desired log entry and press the DELETE key.
6. Click the  button to write this data to the GC unit.

Click the  button to abort and return to the main window.

## 8.2 PARAMETER LIST



Use this function to keep a record of the hardware components and associated parameters for a given GC unit.

To read and edit the Parameter List,

1. Use the *Logs > Parameter List* menu to access this function. MON2000 retrieves the data from the GC unit.

2. The Parameter List dialog appears.

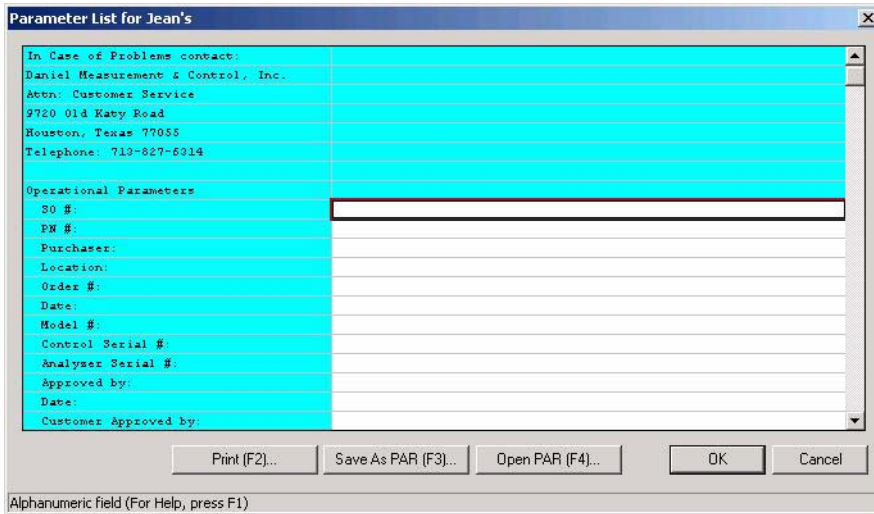


Table 8-1 Items in Parameter List

Type	Parameter
Operational	SO #
	PN #
	Purchaser
	Location
	Order #
	Date
	Model #
	Control Serial #
	Analyser Serial #
	Approved by
	Date
	Customer Approved by
	Date
Drawings	Analyzer Flow
	Sample Conditioning System
	Interconnect Wiring
	Outline and Dimensional
	System Wiring
	Other



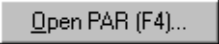
Table 8-1 Items in Parameter List (Continued)

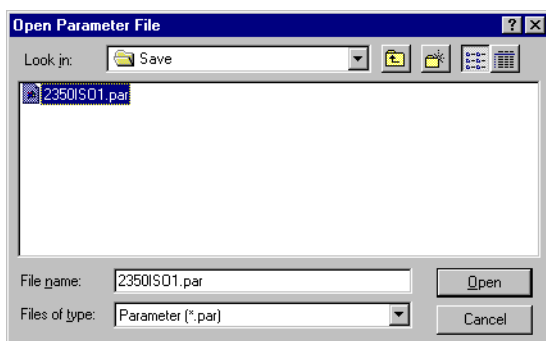
Type	Parameter
Analysis	Settings Flows in cc/min Sample Loop 1 Sample Loop 2 Detector Valve Part Numbers
Sample System	Sample Valve 1 Flow Rate (cc/min) Sample 1 Pressure (PSIG) Sample Valve 2 Flow Rate (cc/min) Sample 2 Pressure (PSIG) SCS Oven Temperature (°C) Solenoid Purge Flow (cc/min/stream)
Column	OD (in.) ID (in.) Length Support Mesh Phase Connected Function

3. To save this data to disk, click the **Save As PAR (F3)...** button or press the F3 key. The Save Parameter File dialog appears.



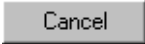
This feature only saves the files in .par format. Use the Save Parameter File dialog to choose the directory location and file name.

4. To open an existing parameter file from disk, click the  button or press the F4 key.



Use the Open Parameter File dialog to choose the desired file.

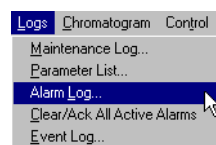
5. Click the  button to write your changes to the GC unit.

Click the  button to abort and return to the main window.

### 8.3 ALARM LOG

Use this function to read and/or clear the various entries in the Alarm Log. The Alarm Log is a circular buffer that contains 50 entries.

To clear or acknowledge all active alarms, see [Section 8.4](#).



To view the Alarm Log,

1. Use the *Logs > Alarm Log* menu to access this function. MON2000 retrieves the last 50 alarms from the GC unit.
2. The Alarm Log dialog appears.

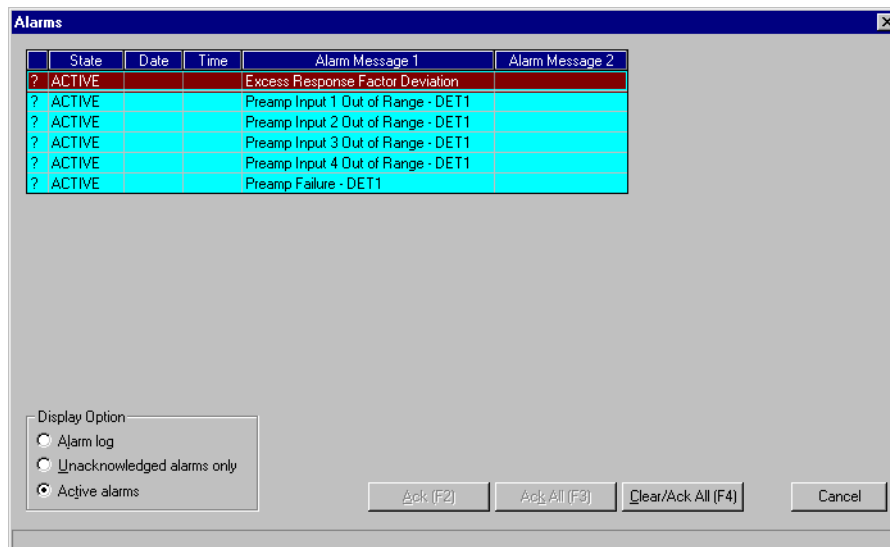


Table 8-2 Alarm Log Attributes

Attribute	Description
<acknowledgement>	<p>indicates whether the alarm has been acknowledge</p> <p>U = unacknowledged ? = status unknown</p>
State	<p>indicates whether the alarm is currently active</p> <p>SET = currently active CLEAR = inactive</p>
Date/Time	<p>date and time the alarm condition began</p>

Table 8-2 Alarm Log Attributes (Continued)

Attribute	Description
Alarm Message 1	describes the alarm condition

**CAUTION**

If an alarm message is changed (see Section 5.6 and Section 5.7) all affected alarm entries, including those previously recorded, will include that change.

Alarm Message 2	displays the alarm limit and current condition values, as applicable
-----------------	--

3. By default, MON2000 displays all recorded alarms.

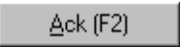
To view only the unacknowledged alarms, click the *Unacknowledged alarms only* radio button.

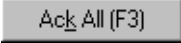
To view only the active alarms, click the *Active alarms* radio button.

4. To acknowledge a single alarm,

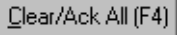
**CAUTION**

An alarm triggered by a user-defined value will continue to display as an active alarm until that value is no longer in the alarm state.

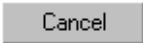
- (a) Ensure you have selected the correct display option (see Step 3).
- (b) Select the alarm you want to acknowledge.
- (c) Click the  button or press the F2 key.

5. To acknowledge all unacknowledged alarms,
  - (a) Ensure you have selected the correct display option (see Step 3).
  - (b) Click the  button or press the F3 key.

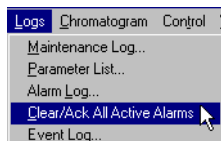
In the Active Alarm view, click the

 button or press the F4 key.

If an alarm is cleared before the condition has been resolved, MON2000 redisplay the alarm entry as an active alarm.

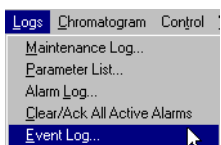
6. Click the  button to exit and return to the main window.

#### 8.4 CLEAR OR ACKNOWLEDGE ACTIVE ALARMS



To clear or acknowledge all alarms, click the Logs pull-down menu and select the *Clear/Ack All Active Alarms* option.

#### 8.5 EVENT LOG

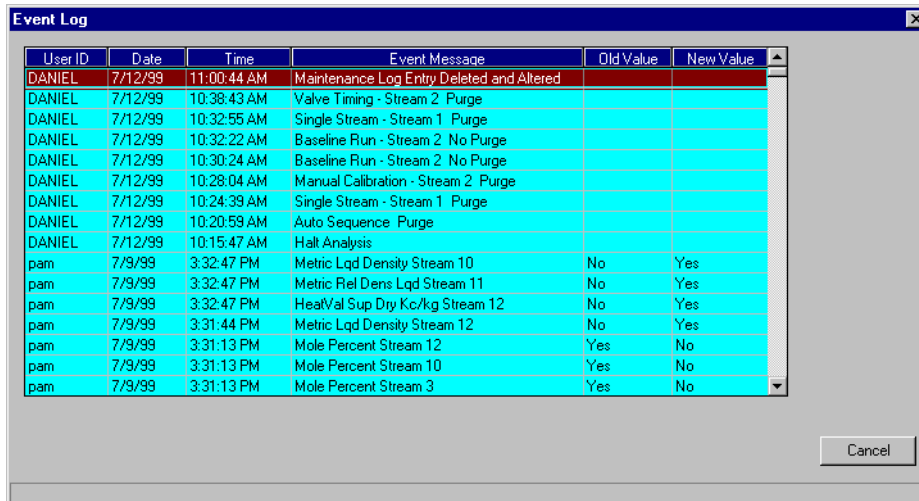


Use this function to track the system and operator events that have occurred with a given GC unit.

To view the Event Log,

1. Use the *Logs > Event Log* menu to access this function. MON2000 retrieves the last 50 events from the GC unit.

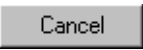
- The Event Log dialog appears, displaying each system or operator event and the corresponding data.



User ID	Date	Time	Event Message	Old Value	New Value
DANIEL	7/12/99	11:00:44 AM	Maintenance Log Entry Deleted and Altered		
DANIEL	7/12/99	10:38:43 AM	Valve Timing - Stream 2 Purge		
DANIEL	7/12/99	10:32:55 AM	Single Stream - Stream 1 Purge		
DANIEL	7/12/99	10:32:22 AM	Baseline Run - Stream 2 No Purge		
DANIEL	7/12/99	10:30:24 AM	Baseline Run - Stream 2 No Purge		
DANIEL	7/12/99	10:28:04 AM	Manual Calibration - Stream 2 Purge		
DANIEL	7/12/99	10:24:39 AM	Single Stream - Stream 1 Purge		
DANIEL	7/12/99	10:20:59 AM	Auto Sequence Purge		
DANIEL	7/12/99	10:15:47 AM	Halt Analysis		
pam	7/9/99	3:32:47 PM	Metric Lqd Density Stream 10	No	Yes
pam	7/9/99	3:32:47 PM	Metric Rel Dens Lqd Stream 11	No	Yes
pam	7/9/99	3:32:47 PM	HeatVal Sup Dry Kc/kg Stream 12	No	Yes
pam	7/9/99	3:31:44 PM	Metric Lqd Density Stream 12	No	Yes
pam	7/9/99	3:31:13 PM	Mole Percent Stream 12	Yes	No
pam	7/9/99	3:31:13 PM	Mole Percent Stream 10	Yes	No
pam	7/9/99	3:31:13 PM	Mole Percent Stream 3	Yes	No

Table 8-3 Event Log Attributes

Attribute	Description
User Id	user name
Date	date event occurred
Time	time event occurred
Event Message	indicates event type (i.e., describes event)
Old Value	if applicable, the value before the event
New Value	if applicable, the value after the event

- Click the  button to exit and return to the main window.

**NOTICE**

The Data Collection feature is only available with the MON2000 PLUS program.

**MON2000 PLUS DATA COLLECTION/AUTO-POLLING****9.1 OVERVIEW**

The MON2000 PLUS program provides configurable automatic collection and storage of analysis and calibration data from the gas chromatograph controller.

Configuration of the specific chromatographs to be polled, timing of polling, and specific data to be collected from each is defined by the user through the setup of polling control files.

An Auto-Sequencing module interprets the commands in a polling control file and performs the collection and storage of data.

Data collected is stored in text files (\*.txt) or comma delimited files (\*.csv). The emphasis is on the data being in a form suitable for import by standard spreadsheet and/or database programs.

Reports collected are stored in text files (.txt) formatted as ready-to-print or in comma-delimited files (.csv) that reduce white space and the output file size.

**NOTICE**

The MON2000 PLUS program is not designed to provide database capability for the data collected.

All Model 500 and 1000 GC's with 2350A and older 2350/2360 GC Controllers and Model 700 GC Controllers are supported in the acquisition of the following types of data:

- Alarms - Selection of Alarm Log, Active Alarms, or Unacknowledged Alarms.
- Averages - Direct Access to single averages and/or blocks of averages to include support for acquiring results from most recent averaging period as well as those for previous averaging periods (number limited by number supported by specific model and application). Access to average value, maximum value, minimum value, and number of samples for the period to be supported.
- CGM Archive - Selection of Last Analysis or Last Calibration and Stream number.
- CGM on Alarm - Poll the CGM when an alarm condition is set or cleared.
- Event Log - Selection of Start/End time, Most Recent n Days, Since Last Collected, or Entire Log.
- Maintenance Log - Selection of Start/End Time, Most Recent n Days, Since Last Collected, or Entire Log
- Registers - Both User Modbus and SIM\_2251 single and multiple register queries are supported.
- Reports - Archive data accessible via Reports>Archive Data>View Data menu are available (selection based on most recent number of days, date range, single stream or all streams). Selections are based on the various GC model and are consistent with the capabilities of those models and specific applications.



- **Condition Start** - Start of conditional polls. The poll commands following the Condition Start are run only when the condition is met. The condition is defined through the status change of a Modbus register (SIM\_2251 or User\_Modbus).
- **Condition End** - End of conditional polls. The poll commands following the Condition End are run normally.

Use these Data Collection functions to configure a polling control file and start the Auto-Sequencing module:

- **Configuration Open File** - Open or edit an existing Polling Control file.
- **Configuration New File** - Create a new Polling Control file and use the Commands to configure the polling settings.
- **Start Auto** - Initiate the Auto-Sequencing module. During Auto-Sequencing a Status display is maintained on the screen.

## 9.2 DATA COLLECTION CONFIGURATION

Use the *Data Collection>Configuration>New File* or *Data Collection>Configuration>Open File* menu to access the Configuration for Data Collection window and the commands to configure the Polling Control file. This function is performed in the Online or Offline mode.

A Polling Control file contains commands to be executed in order to acquire desired sets of data from one or more gas chromatographs.

Select a desired command from the list of available commands and input the necessary data to complete the command (see [Table 9-1](#) for a list of commands). The completed command is added to the Polling Control file. Continue with the next desired command. This process is continued until all commands are selected and configured for the file. Edit the polling control file by adding, deleting, and inserting commands.

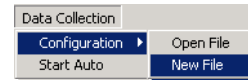
Table 9-1 List of Commands

Command	Description
Await	This command instructs the Auto-Sequencing module to await a specific time of day prior to continuing processing the commands in this file. The user enters the desired time of day in hours and minutes.
Connect/ Logon	The Connect/Logon command instructs the Auto-Sequencing module to establish communications with the indicated GC controller using the communication method and parameters as indicated in the GC directory entry and logon to the GC Controller. After selection of the Connect command the user selects the desired GC controller from a list of the GC directory entries.
Connect/No Logon	Another Poll Command is Connect/No Logon which allows the Auto-Sequencing module to execute without logging on to a GC Controller.
Delay (Seconds)	The Delay (Seconds) command instructs the Auto-Sequencing module to Delay for a specified interval of time prior to proceeding. The user enters the time in seconds.
Delay (Hours)	The Delay (Hours) command instructs the Auto-Sequencing module to Delay for a specified interval of time prior to proceeding. The user enters the time in hours.
Disconnect	This command instructs the Auto-Sequencing module to terminate communications with the controller to which it is currently connected. No additional user provided information is necessary for this command. If this command is executed and no GC Controller is connected, then the command is ignored.
End	This command marks the end of the polling control file and signals the Auto-Sequencing module to stop processing.
Poll	<p>The poll command instructs the Auto-Sequencing module to acquire a set of data of a single type from the GC Controller to which it is currently connected. The user first selects the data type to be acquired.</p> <p>Poll Data Types</p> <ul style="list-style-type: none"> <li>• Alarms</li> <li>• Averages</li> <li>• CGM Archive</li> <li>• CGM on Alarm</li> <li>• Event Log</li> <li>• Maintenance Log</li> <li>• Registers</li> <li>• Reports</li> <li>• Condition Start</li> <li>• Condition End</li> </ul>
Repeat	The repeat command instructs the Auto-Sequencing module to restart processing of the commands in the polling control file at the beginning of the file. The repeat command can be specified with a count that specifies the number of times to execute the sequence of commands in the file. Without the count (or with a count of zero) the sequence of commands will be re-executed indefinitely until terminated manually by the user.
Run	The run command instructs the Auto-Sequencing module to start execution of a user program. The user specifies whether the Auto-Sequencing module waits for completion of the user program before processing the poll control file commands, or continues immediately thus executing in parallel with the user program. This feature allows you to further process the collected data. As an example, the user program might perform some validity checking on the data, reformat it, and then store it in an Access database on the MON2000 PLUS PC.

### 9.2.1 Create a New Polling Control File

To create and configure a new polling control file,

1. Use the *Data Collection > Configuration>New File* menu to access this function.
2. MON2000 PLUS displays the Configuration for Data Collection window.
3. From the Polling Output File(s) table select Report and/or Data type by clicking the appropriate check box. Enter the Default Filename field for the chosen selections.



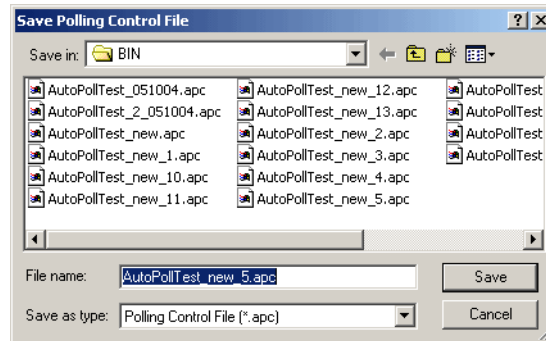
Polling Output File(s):		Default Filename	File Format
Report	<input checked="" type="checkbox"/>	Sample Report	Text <*.txt>
Data	<input checked="" type="checkbox"/>	Sample Data	Comma-Delimited <*.csv>

4. From the Commands pull-down list, select a command.

General Configuration (List of Commands):							
	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll Await Connect/Logon Delay (Seconds) Disconnect End Poll Repeat Connect/No Logon Delay (Hours)						

5. Enter the necessary data and a description for the command.
6. Use the add, Insert, Delete, and Poll Command buttons to add/edit/modify the configuration.
7. When you have finished adding/editing/modifying the commands, click the Save button.

- The Save Polling Control File dialog appears. Enter a filename and click the Save button to save the \*.apc file.

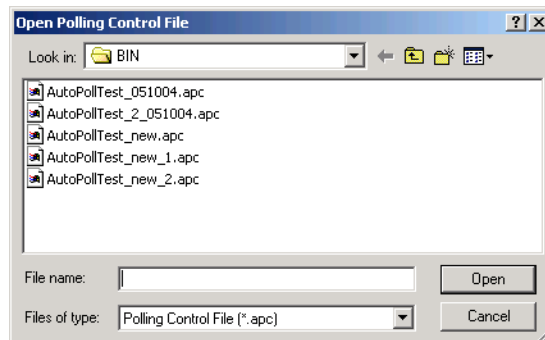


### 9.2.2 Open an Existing Polling Control File

To edit or modify the configuration of an existing file,

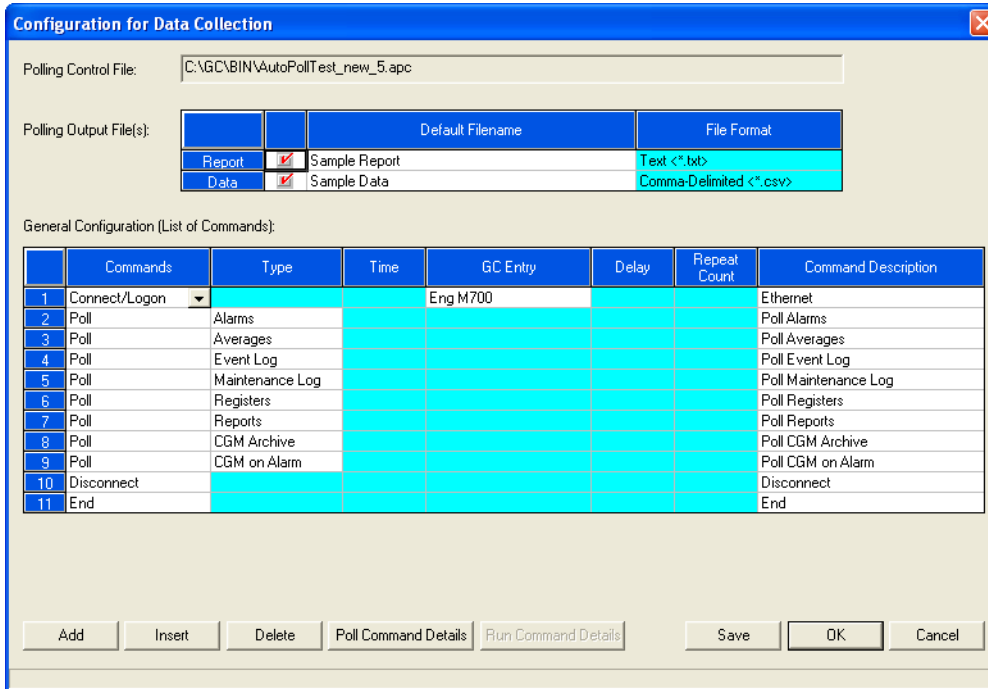





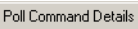

- From the MON2000 PLUS main window, use the *Data Collection>Configuration>Open File* menu.
- Click the **Open** button and the Open Polling Control File window displays.

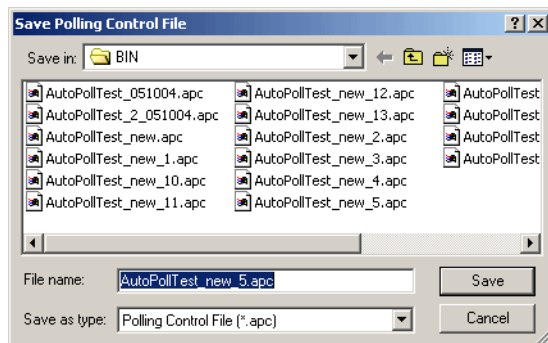


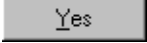
- Select the desired polling control file, then click the **Open** button.

#### 4. The Configuration for Data Collection window displays.




- Use the     buttons to modify the Data Collection configuration or Polling Control file.
- When you have finished modifying the file, click the  button to apply the changes.
- The Save Polling Control File dialog appears.



8. A Save Polling Control message prompts you to replace the exiting file or rename the Polling Control file (\*.apc) file. Click the  button to replace the existing file.

Or,

9. Click the  button to discard your changes.

### 9.2.3 Await Command

This command instructs the auto-sequencing module to wait for a specific time of day prior to processing the commands in the file. The user enters the desired time of day in hours and minutes.

To configure the Await Command,

1. From the General Configuration Commands pull-down list select the Await command.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Await		04:00 AM				Await

2. Press the **RIGHT ARROW** key on your keyboard or **LEFT-CLICK** the mouse in the Time field and enter the time.
3. Press the **RIGHT ARROW** key on your keyboard or **LEFT-CLICK** the mouse in the Command Description field. Enter a description for the Await command in the Command Description field.

### 9.2.4 Connect/Logon Command

The Connect/Logon command instructs the Auto-Sequencing module to establish communications with the indicated GC controller, using the communication method and parameters as indicated in the GC directory entry and logon to the GC Controller. After selection of the Connect command the user selects the desired GC controller from a list of the GC directory entries.

To configure the Connect/Logon Command,

1. Select **Connect/Logon** from the General Configuration Commands pull-down list.

General Configuration (List of Commands):							
	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Connect/Logon			Eng M700			Logon

2. From the GC Entry list that is configured in the *File>GC Directory* menu, select the desired GC Controller.
3. Enter a description for the **Connect/Logon** command in the Command Description field.

## NOTICE

Use the communication method and parameters as configured in the *File>GC Directory* entry.



### 9.2.5 Connect/No Logon Command

The Poll Command Connect/No Logon allows the Auto-Sequencing function to execute without logging on to a GC Controller.

To configure the Connect/No Logon Command,

1. Select **Connect/No Logon** from the General Configuration Command pull-down list.

General Configuration (List of Commands):							
	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Connect/No Logon			Eng M700			No Logon

2. From the GC Entry list that is configured in the *File>GC Directory* menu, select the desired GC Controller.
3. Enter a description for the Connect/No Logon command in the Command Description field.

### 9.2.6 Delay (Seconds) Command

Prior to executing the auto-polling function, the **Delay (Seconds) Command** instructs the Auto-Sequencing module to delay for a specified interval of time. The user enters the time delay in one second increments.

To configure the Delay (Seconds) Command,

1. From the General Configuration List of Commands pull-down list, select **Delay (Seconds)**.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Delay (Seconds)					30	Delay (Seconds)

2. Enter the time delay, in one second increments, in the Delay field.
3. Enter a description for the Delay (Seconds) command in the Command Description field.

### 9.2.7 Delay (Hours) Command

Prior to executing the auto-polling function, the **Delay (Hours) Command** instructs the Auto-Sequencing module to delay for a specified interval of time. The user enters the time delay in one hour increments.

To configure the Delay (Hours) Command,

1. From the General Configuration List of Commands pull-down list, select **Delay (Hours)**.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Delay (Hours)					2	Delay (Hours)

2. Enter the time delay, in one hour increments, in the Delay field.
3. Enter a description for the Delay (Hours) command in the Command Description field.

### 9.2.8 Disconnect Command

Use the **Disconnect Command** to terminate communications with a currently connected GC Controller.

To configure the Disconnect command,

1. From the General Configuration: List of Commands, use the Commands pull-down list and select **Disconnect**.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Disconnect						Disconnect

2. Enter a description for the Disconnect Command in the Command Description field.

No additional input parameters are required for this command. Also note, if you are not connected to a GC Controller, this command is ignored.

### 9.2.9 End Command

The **End Command** marks the end of the polling control file and signals the Auto-Sequencing module to stop processing.

1. From the Configuration for Data Collection window, click the  button to select another command.
2. Use the Command pull-down list, and select **End**.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	End						End

3. Enter a description for the End Command in the Command Description field.

### 9.2.10 Poll Command: Alarms

## NOTICE

Each Poll Command includes the criteria to define the acquisition and storage of a single type of data.

To configure the Alarms Command, from the Configuration for Data Collection window,

1. Select **POLL** from the General Configuration Commands pull-down list.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Alarms					Alarms

2. Press the **RIGHT ARROW** key on your keyboard or **LEFT-CLICK** the mouse in the Type field and select Alarms from the pull-down list.
3. In the Command Description field, enter a description for the Alarms command.
4. Click the **Poll Command Details** button. The Poll Command: Alarms dialog box displays.

**Poll Command: Alarms**

Alarms Configuration:

		Time Selection	Starting Date	Starting Time	Ending Date	Ending Time	n Days
Alarm Log	<input type="checkbox"/>						
Active Alarms	<input checked="" type="checkbox"/>						
Unacknowledged Alarms	<input checked="" type="checkbox"/>						

Output File:

Filename	File Format
alarms	Text <*.txt>

OK Cancel

5. To select Alarm Log, click the Alarm Log check box. **RIGHT ARROW** key on your keyboard or **LEFT-CLICK** the mouse in the **Time Selection** field.

6. Use the Time Selection pull-down list and choose one of the following:
  - Start/End Time
  - Most Recent
  - Since Last Collected

Alarms Configuration:

		Time Selection	Starting Date	Starting Time	Ending Date	Ending Time	n Days
Alarm Log	<input checked="" type="checkbox"/>	Start/End Time	01/30/2006	12:00 AM	01/30/2006	11:59 PM	
Active Alarms	<input checked="" type="checkbox"/>						
Unacknowledged Alarms	<input checked="" type="checkbox"/>						

Use the **Up** and **Down** arrows and enter the starting date, starting time, ending date and ending time in the appropriate data fields.

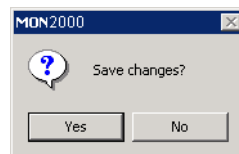
7. If Active Alarms or Unacknowledged Alarms is selected, no additional information is necessary and all of the entries of the selected type are returned.
8. From the Output File table, enter/edit a filename and file format for the Alarms Output file.

Output File:

Filename	File Format
Alarms	Text <*.txt>

9. Click the  button to apply the selections.

MON2000 PLUS displays the Save Changes dialog.



10. Click the  button to save the changes and return to the Configuration for Data Collection window.

Or,

Click the  button to discard your changes.

### 9.2.11 Poll Command: Averages

To configure the Averages Command, to acquire sets of one or more averages for the most recent averaging period and/or the previous averaging period (any available in the GC Controller),

## NOTICE

**MON2000 PLUS reads all the Averages configuration (set up from the *Applications > Calculations > Averages* menu) if connected to GC controller.**

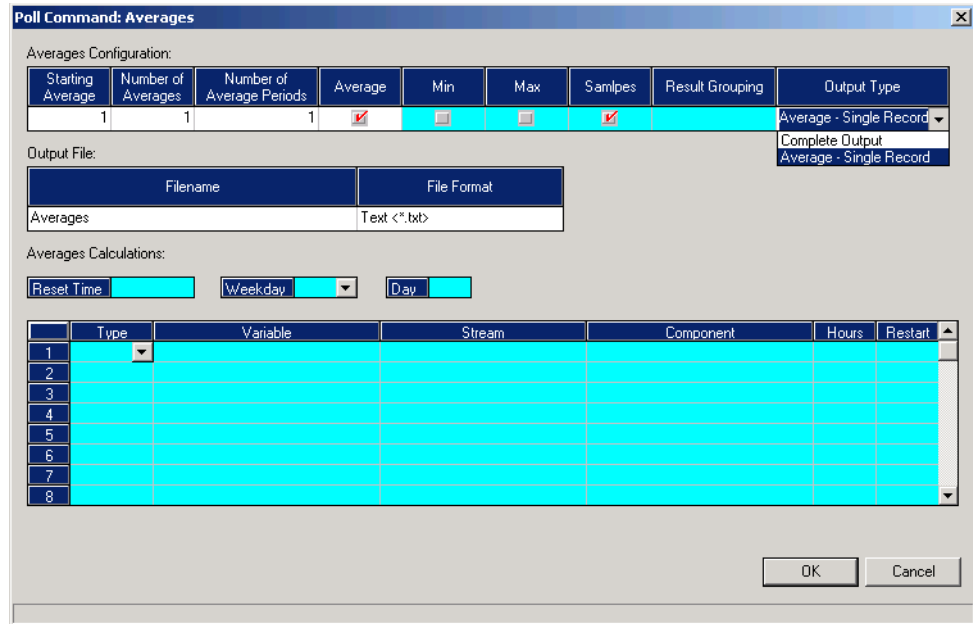
**If you are using a Direct Connection (rather than an Ethernet Connection), the reading process could take a long time.**

1. From the Configuration for Data Collection window, select the **Poll** command.

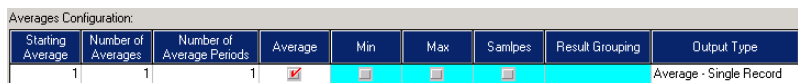
General Configuration (List of Commands)							
	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Averages					Averages

2. Press the **RIGHT ARROW** key or click in the **Type** field, then select **Averages** from the pull-down list.
3. Press the **RIGHT ARROW** key on your keyboard, or left-click the mouse in the **Command Description** field. Enter a description for the Averages command.

- Click the **Poll Command Details** button and the **Poll Command: Averages** dialog box displays.



- From the Averages Configuration dialog, for a single record, select **Average - Single Record**. If the Average - Single Record is selected, only the average values are included in the output file.



Or,

If **Complete Output** Complete Output is selected, click the check boxes to select Average, Min, Max, or Samples values.

## NOTICE

All averages referenced by a single Poll command must be for the same averaging interval (e.g. hourly, daily, weekly, monthly, variable).

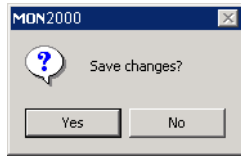
Averages Configuration:								
Starting Average	Number of Averages	Number of Average Periods	Average	Min	Max	Samples	Result Grouping	Output Type
1	1	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	By Average	Complete Output
Output File:								Complete Output Average - Single Record

Use the Result Grouping pull-down list and select **By Period** or **By Average**.

If the number of averages is greater than one, then select whether the results are to be grouped by average, or grouped by period.

- (a) When grouped by Average, the data from all of the periods of a given average are stored in a single record in the output file with the appropriate time-stamp included with the data for each period.
- (b) When grouped by Period, a record for each period contains the values from each of the averages for that period and a single time stamp value is included in the record.





6. From the Output File table, enter/edit the filename and file format (\*.txt or \*.csv) for the Averages Output file.
7. Click the  button to apply the configuration changes.
8. MON2000 PLUS displays the Save Changes dialog.
9. Click the  button to write the changes and return to the Configuration for Data Collection window.

Or,

Click the  button to discard your changes.

### 9.2.12 Poll Command: CGM Archive

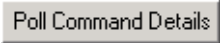
Use the CGM Archive command to poll either the Last Analysis or Last Calibration CGM Archive for a specific stream. The output file is in \*.cgm format and the file name is based on the Analyzer Name, Stream, and Date/Time. The CGM file is stored in the "\\GC\SAVE\CGM Archive" folder.

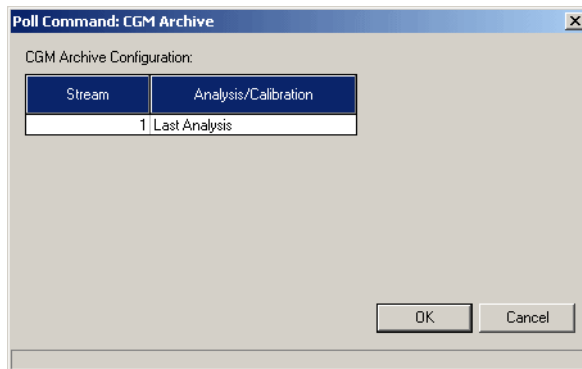
To configure the CGM Archive Command,

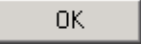
1. From the Configuration for Data Collection window, click the **ADD** button to select another command.
2. Next, select the Poll command.

General Configuration (List of Commands)							
	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	CGM Archive					CGM Archive

3. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Type field, then select CGM Archive.

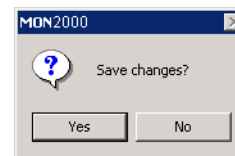
4. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Command Description field. Enter a description for the CGM Archive command.
5. Click the  button and the Poll Command: CGM Archive dialog box appears.



6. Enter the Stream number for data collection.
7. Use the Analysis/Calibration pull-down list and select the CGM Archive for the Last Analysis or Last Calibration.
8. Click the  button to apply the configuration changes. MON2000 PLUS returns you to the Configuration for Data Collection window.

Or,


9. Click the  button to discard your changes.



### 9.2.13 Poll Command: CGM on Alarm

Use the CGM on Alarm command to poll the CGM when an alarm condition is set or cleared. Setup continuous polls so that MON2000 PLUS can determine and retrieve the CGM with the alarm condition. The data is saved to an output file in CGM format and is stored in the "\GC\SAVE\ERRORS" folder. The file name is based on the Date/Time and ends with an 'a'.

To configure the CGM on Alarm Command,

1. From the Configuration for Data Collection window, click the  button to select another command.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	CGM on Alarm					CGM on Alarm

2. Next, select the Poll command.
3. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Type field, then select CGM on Alarm.
4. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Command Description field. Enter a description for the CGM on Alarm command. No further details are needed.

### 9.2.14 Poll Command: Condition Start

Use the **Condition Start** command to start conditional polling.

To configure the Condition Start command,

1. From the General Configuration (List of Commands) table, select **Poll** from the Command column.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Condition Start					

2. Select **Condition Start** from the pull-down list in the Type column.
3. Enter a description in the Command Description column.
4. Select a default output file format by clicking either the **Report** or **Data** checkbox on the Polling Output File(s) table.
5. Enter a default output file name.
6. Click the **Poll Command Details** button located at the bottom of the Configuration for Data Collection window. The Poll Command: Condition Start window appears.

Condition Start Configuration:

Condition Data Type	Condition Data Value	Condition Status
Register/SIM_2251	1	Change

OK Cancel

7. Select **Register/SIM\_2251** or **Register/User\_Modbus** from the Condition Data Type column.
8. Enter the register number in the Condition Data Value column.
9. Select **Change** from the Condition Status column.

10. To apply the configuration changes, click **OK**. To discard your changes and return to the Configuration for Data Collection window, click **Cancel**.

### 9.2.15 Poll Command: Condition End

Use the **Condition End** command to stop conditional polling.

To configure the Condition End command,

1. From the General Configuration (List of Commands) table, select **Poll** from the Command column.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Condition End					

2. Select **Condition End** from the pull-down list in the Type column.
3. Enter a description in the Command Description column.

### 9.2.16 Poll Command: Event Log

1. From the General Configuration: List of Commands, use the Commands pull-down list and select the **POLL** command.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Event Log					Event Log

2. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse Type field and select **Event LOG** from the pull-down list.
3. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Command Description field. Enter a description for the Event Log command.
4. Click the **Poll Command Details** button and the Poll Command: Event Log dialog box displays.

Poll Command: Event Log

Event Log Configuration:

Event Log Selection	Start Date	Start Time	End Date	End Time	n Days
Entire Log					

Output File:

Filename	File Format
New Data File	Comma-Delimited (*.csv)

OK Cancel

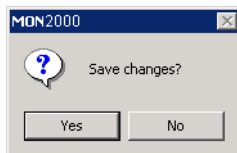
5. From the Event Log Selection pull-down list, choose one of the following:


Event Log Selection	Additional Selections
Start/End Time	Start Date
	Start Time

Event Log Selection	Additional Selections
	Ending Date
	Ending Time
Most Recent n Days	Enter number of n Days
Since Last Collected	No further information is needed
Entire Log	No further information is needed

6. For each entry in the Event Log which satisfies the selection criteria, a record containing the following information is stored:
  - User ID of user initiating the change (or SYSTEM)
  - Date/time of occurrence
  - Description of the event
  - Parameter value prior to the event (old value)
  - Parameter value after the event (new value)
7. From the Output File table, enter/edit the filename and file format (\*.txt or \*.csv) for the Event Log Output file.
8. Click the  button to apply the configuration changes.
9. MON2000 PLUS displays the Save Changes dialog.
10. Click the  button to write the changes and return to the Configuration for Data Collection window.

Or,

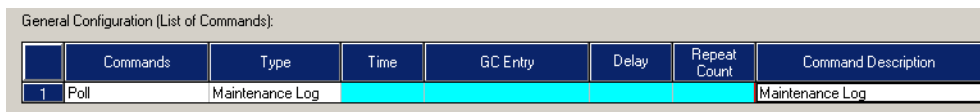


Click the  button to discard your changes and return to the Configuration for Data Collection window.

### 9.2.17 Poll Command: Maintenance Log

To configure the Maintenance Log command,

1. From the General Configuration: List of Commands, use the Commands pull-down list and select the **POLL** command.



	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Maintenance Log					Maintenance Log

2. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse Type field and select Maintenance Log from the pull-down list.
3. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Command Description field. Enter a description for the Maintenance Log command.



4. Click the **Poll Command Details** button and the **Poll Command: Maintenance Log** dialog box displays.

**Poll Command: Maintenance Log**

Maintenance Log Configuration:

Maintenance Log Selection	Start Date	Start Time	End Date	End Time	n Days
Start/End Time	12/29/2005	12:00 AM	12/29/2005	11:59 PM	

Output File:

Filename	File Format
Maintenance Log	Comma-Delimited (*.csv)


OK Cancel

5. From the Maintenance Log Configuration Selection table, choose one of the following:

Maintenance Log Selection	Additional Selections
Start/End Time	<ul style="list-style-type: none"> <li>• Start Date</li> <li>• Start Time</li> <li>• End Date</li> <li>• End Time</li> </ul>
Most Recent n Days	<ul style="list-style-type: none"> <li>• Enter number of n Days</li> </ul>
Since Last Collected	<ul style="list-style-type: none"> <li>• No further information is needed</li> </ul>
Entire Log	<ul style="list-style-type: none"> <li>• No further information is needed</li> </ul>

6. From the Output File table, enter/edit the filename and file format (\*.txt or \*.csv) for the Maintenance Log Output file.
7. Click the **OK** button to apply the configuration changes.

Or,

8. Click the  button to discard your changes and return to the Configuration for Data Collection window.

### 9.2.18 Poll Command: Registers

Blocks of Modbus Register data can be specified for collection.

To configure the Registers Command,

1. From the General Configuration: List of Commands, use the Commands pull-down list and select the **POLL** command.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Registers					Registers

2. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse Type field and select Registers from the pull-down list.
3. Press the **RIGHT ARROW** key on your keyboard, or **LEFT-CLICK** the mouse in the Command Description field. Enter a description for the Registers command.

## NOTICE

**MON2000 PLUS** reads all the configured Registers associated with the Modbus Type (Sim\_2251 or User\_Modbus) if you are connected to a GC Controller.

If you are using a direct connection (rather than an Ethernet connection), the reading process could take a long time.

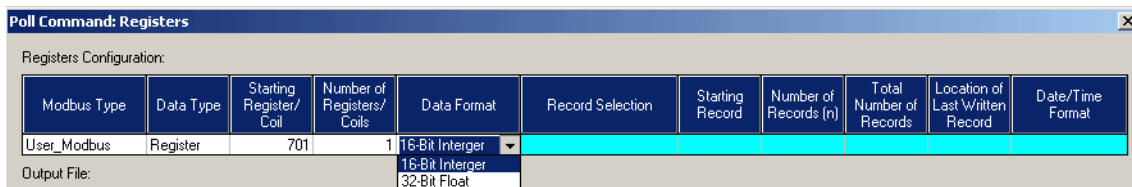
When initially building a "polling control" file, you may want to use the **MON2000 PLUS** "Offline Edit" function with an "as configured" version of the application open to avoid these delays.



(a) If SIM\_2251 is selected and the Starting Register is in the range 701 - 999, then Record Selection includes the following:

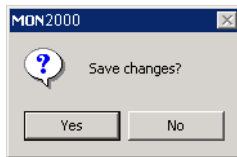
Record Selection	Additional Selections
<b>Starting Record + n</b>	Starting Record number
	Number of Records (n)
	Total Number of Records
<b>Most Recent n Records</b>	Number of Records (n)
	Total Number of Records
	Location of Last Written Record
<b>Since Last Collection</b>	Total Number of Records
	Location of Last Written Record
	Date/Time Format

(b) If USER MODBUS is selected, and Data Type is Register, then the user must enter a Data Format string to define for each parameter being requested (an integer 16-bit or floating-point 32-bit value). Floating-point values use two consecutive registers for storage.



- (c) For the standard registers, the values returned are stored in a single record in the output file, following the Date and Time when the registers are polled, the Starting Register, and Number of Registers.
- (d) For SIM\_2251 registers 701-999, one record is stored in the output file for each record retrieved with fields within the record, starting the date and time when the record is polled, starting Register (701-999), Record Number, and the data for the record.

5. From the Output File table, enter/edit the filename and file format (\*.txt, \*.dat or \*.csv) for the Registers Output file. The DAT file format is for customized chroma data.
6. Click the  button to apply the configuration changes.
7. MON2000 PLUS displays the Save Changes dialog.



8. Click the  button to write the changes and return to the Configuration for Data Collection window.

Or,

9. Click the  button to discard your changes and return to the Configuration for Data Collection window.

### 9.2.19 Poll Command: Reports

The archived analysis reports (as viewable under MON2000 when connected to a controller, from the *Reports>Archived Data>View Data* menu) can be retrieved and stored.

To configure the Reports Command,

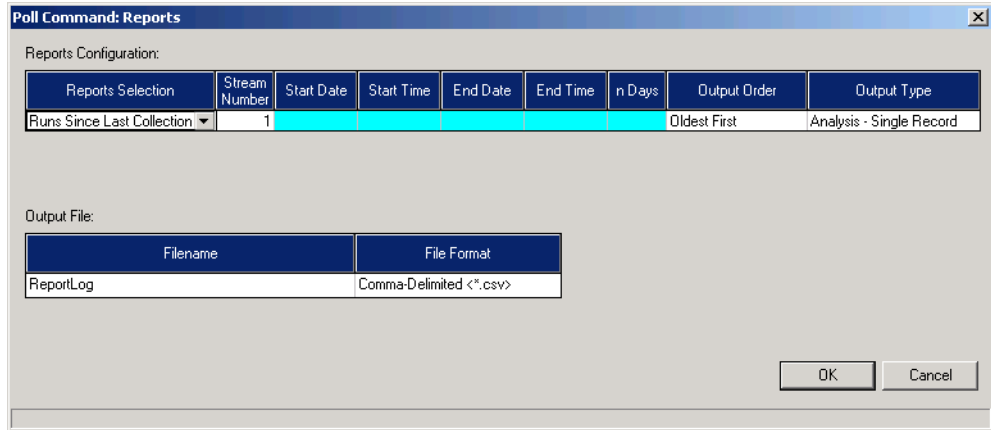
1. From the Configuration for Data Collection window, click the ADD button to select another command.

General Configuration (List of Commands):

	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Poll	Reports					Reports

2. Next, select the Poll command.
3. Press the **RIGHT ARROW** on your keyboard, or **LEFT-CLICK** the mouse in the Type field, then select Reports from the pull-down list.
4. Press the right arrow on your keyboard, or left-click the mouse in the Command Description field. Enter a description for the Reports command.

- Click the **Poll Command Details** button and the **Poll Command: Reports** dialog box appears.



- Use the following selection criteria and then enter appropriate data:

Reports Selection	Additional Selections
Start/End Time	<ul style="list-style-type: none"> <li>Stream Number (0 - indicate all streams)</li> <li>Start Date</li> <li>Start Time</li> <li>End Date</li> <li>End Time</li> </ul>
Most Recent n Days	<ul style="list-style-type: none"> <li>Stream Number (0 - indicate all streams)</li> <li>Enter number of n Days</li> </ul>
Runs Since Last Collection	<ul style="list-style-type: none"> <li>Stream Number (0 - indicate all streams)</li> </ul>

- Regardless of the selection criteria method used above, choose the order of returned reports in the Output Order (with Most Recent First or with Oldest First).
- Next, select the Output Type, as a Complete Report or an Analysis - Single Record.

9. From the Output File table, enter/edit the filename and file format (\*.txt or \*.csv) for the Reports Output file.
10. Click the  button to apply the configuration changes.  
Or,
11. Click the  button to discard your changes and return to the Configuration for Data Collection window.

### 9.2.20 Repeat Command

Use the **Repeat** command to instruct the Auto-Sequencing module to restart processing of the commands in the polling control file (from the beginning of the file). Specify a count for the number of times to execute the sequence of commands in the file. Without a specified count (or with a count of zero) the sequence of commands will be re-executed indefinitely until terminated manually by the user.

To configure the Repeat command,

1. From the General Configuration List of Commands pull-down list, select **Repeat**.

General Configuration (List of Commands)							
	Commands	Type	Time	GC Entry	Delay	Repeat Count	Command Description
1	Repeat					1 Repeat	

2. Enter the number of times to repeat the Auto-Sequencing process, in the Repeat Count field.
3. Enter a description for the Repeat Command in the Command Description field.



### 9.2.21 Run Command

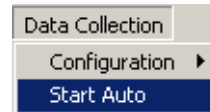
The run command (future release) instructs the Auto-Sequencing module to start execution of a user program. The user specifies whether the Auto-Sequencing module waits for completion of the user program before processing the poll control file commands, or continues immediately thus executing in parallel with the user program. This feature allows you to further process the collected data. As an example, the user program might perform some validity checking on the data, reformat it, and then store it in an Access database on the MON2000 PLUS PC.

## 9.3 DATA COLLECTION

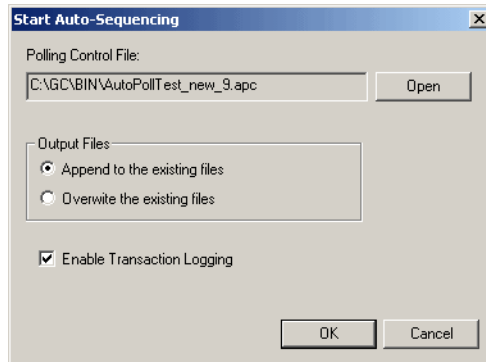
The Data Collection Start Auto function allows you to open an existing polling control file, select to append or overwrite the existing output files, select whether to enable Transaction Logging, and start the automatic data collection.

### 9.3.1 Start Auto-Sequencing

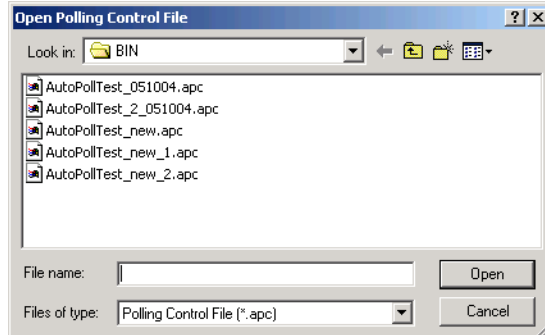
To initiate Auto-Sequencing, use the *Data Collection*>*Start Auto* menu,



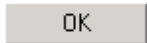
1. Click **START AUTO** and the Start Auto-Sequencing dialog appears.



2. Click the **Open** button and the Open Polling Control File dialog appears.



3. Select the desired polling control file, and then click the **Open** button.
4. From the Output Files selection, click the desired radio button:
  - Append to the existing file
  - Overwrite the existing file
5. In the check box, select Enable Transaction Logging (if desired).

6. Click the  button to confirm the start of automatic operation. MON2000 PLUS begins the Auto-Sequencing process and displays the Auto-Sequencing Status window.
7. The Auto-Sequencing module begins with the first command in the selected polling control file and performs the requested operation. Processing continues sequentially through the file performing the operations requested by each command.
  - (a) If a Repeat command is encountered, then the processing is restarted at the beginning of the file.
  - (b) If an End command (or the end-of-file) is encountered, the module ends the command processing.

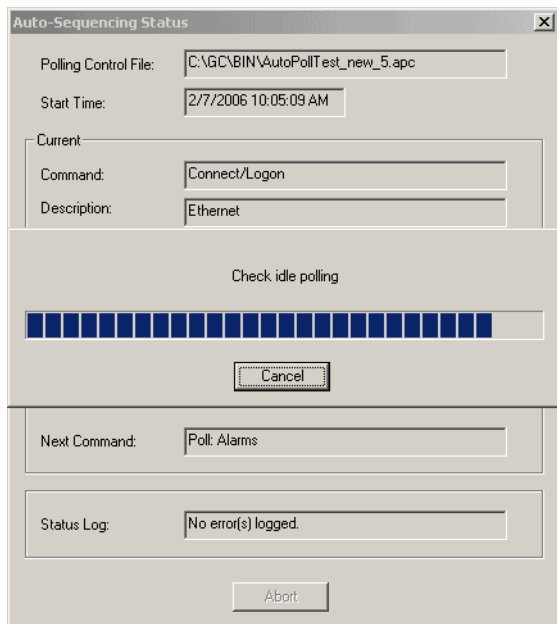
### 9.3.2 Transaction Log

To enable the Transaction Logging functions, select the check box on the Start Auto-Sequencing dialog. If this option is chosen, one or more entries are made to the AutoPollCommsLog.txt file each time a command is executed.

Transaction Log entries include a time stamp and a description of the command being executed. If the command results in Modbus messages being exchanged between the PC and the controller, the poll message from the PC and the response from the controller are recorded.

### 9.3.3 Auto-Sequencing Status

During Auto-Sequencing a status display is maintained on the screen.



As each command is processed the following general information is displayed (depending on the command being processed, the details of the exact data included will vary:

- Polling Control file in use
- Start time of operation
- Command being processed
- Description of command being processed
- Status of completion of the command (level detail appropriate to the individual command)
- Next Command to be processed
- Status Log

Auto-Sequencing must be stopped before other MON2000 PLUS menu selections can be chosen.

Terminate Auto-Sequencing at any time by clicking the Abort button on the Auto-Sequencing status display screen. If this occurs, the Auto-Sequencing module will close all open output files and return to normal operation of the MON2000 PLUS program.

#### **9.3.4 Status Log**

When MON2000 PLUS detects connection or polling errors, the error condition is logged and a Status Log file is saved as:  
AutoPollStatusLog.txt.

The Status Log field on the Auto-Sequencing Status dialog indicates the error condition.

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## MODBUS TEST

The Modbus Test Program (WinMB) enables you to test the operation of the serial port communications, and determine Modbus register and log contents. Use this program as an aid to software debugging or for special installations. Via WinMB, you can troubleshoot with any device including the GC Controller, an ultrasonic meter, or a flow computer.

### CAUTION

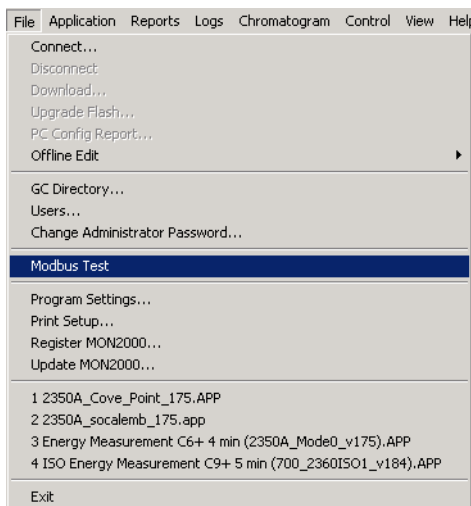
#### FUNCTION NOT REQUIRED FOR NORMAL GC OPERATION

##### The Modbus test is reserved for advanced functions

The Modbus Test function is not required for normal GC operation. Skip this section unless you are developing software, engaging in a software debugging process, or designing a custom installation that directly accesses the GC Controller Modbus registers.

Traditionally, Modbus registers are polled by using a data collection system (DCS). To facilitate installation and debugging, the WinMB program emulates a DCS.

This section provides detailed instructions for using the WinMB program. Use this program only if you are familiar with Modbus communication protocol and the operation of the MON2000 software.

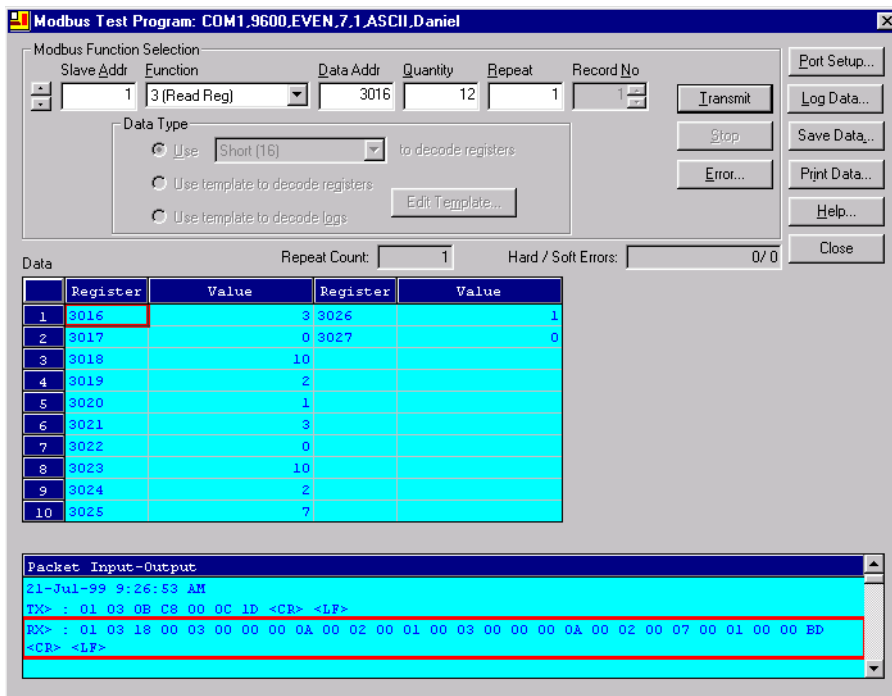


### 10.1 STARTING WINMB

To start WinMB from MON2000, pull down the File menu and click the *Modbus Test* option.

If MON2000 displays an error, verify the installation directory via the Program Settings function (see [Section 2.16.2](#)).

The Modbus Test Program main window appears.



## 10.2 ESTABLISHING COMMUNICATIONS

Use the following instructions to configure the desired communications settings.

If you are accessing WinMB via MON2000, WinMB defaults to the same communications and serial port settings as those set for MON2000. To set up a WinMB-specific configuration, see [Section 10.2.3](#).



### 10.2.1 Comparison of Modbus Protocols

MON2000 software and the WinMB program accommodate two different Modbus protocols: SIM\_2251 and User\_Modbus. For each protocol, separate Modbus registers are reserved.

Thus some settings for MON2000 and WinMB depend on which Modbus protocol is used.

The protocol you need depends, ultimately, on the hardware used for data acquisition from the GC Controller Modbus register contents.

The following comparison should help clarify the differences between these protocols as well as the utility of each.

*Table 10-1 Comparison of SIM\_2251 and User\_Modbus Protocols*

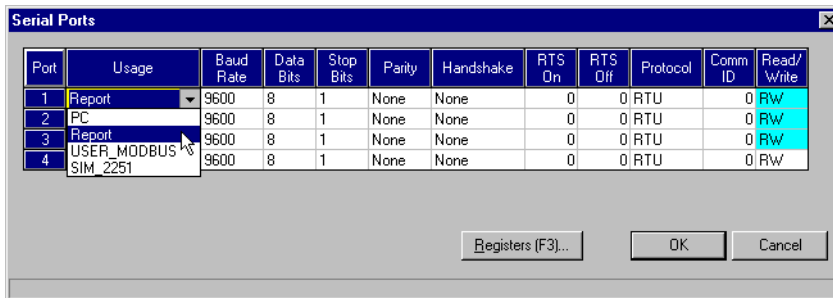
SIM_2251	User_Modbus
serial slave port	serial slave port
modified protocol that allows floating point numbers to be transmitted over Modbus via 2251 emulation slave type	standard Gould protocol that accommodates PLC Emulation LO-HI (PLC-LH)
most register contents are predefined; some registers can be user-defined	predefined Boolean (coils) user-defined Numeric (registers)
data types are predefined for registers 1000 to 9000	data types are user-defined
variables assigned to registers can be listed in the PC Config Report (for instructions, <a href="#">see Section 2.16.3</a> ; for an example report, <a href="#">see Appendix A</a> ). <a href="#">See Appendix F</a> for more detail about individual registers.	variables assigned to registers can be listed in the PC Config Report (for instructions, <a href="#">see Section 2.16.3</a> ; for example report, <a href="#">see Appendix A</a> )
When using WinMB, set <i>Register Mode</i> to “DANIEL” to view register contents.	When using WinMB, set <i>Register Mode</i> to “PLC- LH” or “PLC-HL” to view register contents.
It is not necessary to assign scales to registers.	It may be necessary to assign scales to registers, to convert floating point values to whole integer representations.

## 10.2.2 Set GC Com Parameters via MON2000

Set the communication parameters for the GC Controller serial port to which your PC, or other device, is connected.

To determine or reset the communications parameters at the GC Controller,

1. Use the *Application > Serial Ports* menu to access the Serial Ports function. The Serial Ports dialog appears.



2. Verify the MON2000 serial port Usage setting.
  - (a) Determine the GC Controller serial port to which you are directly connected.
  - (b) In the Serial Ports dialog, ensure that the Usage setting for the port is either “SIM-2251” or “User\_Modbus”.

If the setting is incorrect, change it by using the provided combo box.

3. Verify the *Baud Rate* setting.

WinMB accepts the following baud rates:  
300, 1200, 2400, 4800, 9600, 14400, 19200,  
38400, 57600, 115200.

4. Ensure the remaining serial port parameters are correct. Revise as required and record for future reference.

### NOTICE

**Consult accurate documentation of the GC installation or visually inspect the serial line connection at the GC Controller Terminal Board.**

Typical settings are:

*Table 10-2 Typical GC Communications Parameters*

Parameter	RTU Setting	ASCII Setting
Data Bits	8	7
Stop Bits	1	1
Parity	None	Even
Handshake	None	None
RTS On	0	0
RTS Off	0	0
Ptctl	RTU	ASCII


## NOTICE

RTS On/Off settings are required only when line settling is needed before data transmission begins.

## NOTICE

Record the true Device ID number for future use.

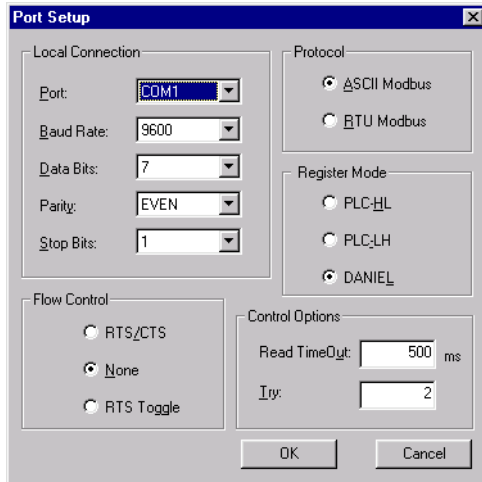
Note that the RTU protocol permits a more efficient data transmission for it uses significantly less bits than ASCII.

5. Check the *Com ID* setting. The Com ID is the slave address defined by MON2000.
6. Verify that the *RW* setting is either “R” or “RW”.
7. Click the  button to accept your input and return to the main screen.

### 10.2.3 Set Up Port via WinMB

To determine or reset the communications parameters used by WinMB,

1. Click the **Port Setup...** button to access the Port Setup function. The Port Setup dialog appears.



2. Define the WinMB serial port setup options.

*Table 10-3 Typical WinMB Port Parameters*

Parameter	Typical Setting
Port	COM1 or COM2
Baud Rate	9600
Data Bits	7 or 8
Parity	Even or None
Stop Bits	1
Flow Control	None
Control Options	Read Timeout, 500 ms Try, 2
Register Mode	Daniel (for SIM_2251): PLC-LH (for User_Modbus) PLC-LH
Protocol	ASCII Modbus RTU Modbus

## NOTICE

The serial port settings displayed are for the serial communication parameters at the PC. These settings must match the GC Controller settings (to verify, see [Section 10.2.2](#)).

For direct connection to the GC Controller, ensure that the Port setting is the same as the Com ID number of the serial port used.

3. Click the **OK** button to accept your input and return to the main screen.

### 10.3 GETTING MODBUS DATA

#### NOTICE

To access previous settings, use the spin arrows to view and select.



Use the following steps to read or write register contents to the GC Controller (or any other device). See the following subsections for additional details.

Before retrieving data, print a PC Config Report (see [Section 2.16.3](#)) and check the Communication data for variable names assigned to the Modbus registers.

Slave Addr	Function	Data Addr	Quantity	Repeat	Record No
1	3 (Read Reg)	0	1	1	1

1. In the *Slave Addr* data field, type the Comm ID of the GC unit (or other device). WinMB will accept a slave address of 1 to 247.

Enter “0” to use the broadcast mode. In the broadcast mode, WinMB polls all known devices. Each device interprets this message as an instruction to read and take action; however, a response message may not be received by WinMB.

#### NOTICE

Any change is applied to the corresponding register value at each device. [Table 10-4](#) shows which function codes support the broadcast mode.

- Use the *Function* pull-down menu to select the desired read or write option.

Table 10-4 Available Modbus Function Codes

Function Code	Description	Broadcast
1 (Read Coil)	read one or more coil values	
3 (Read Reg)	read one or more register values	
5 (Set Single Coil)	set (write) one coil value	✓
5 (Set Single Reg)	set (write) one register value	✓
15 (Set Multiple Coils)	set (write) multiple coil values	✓
16 (Set Multiple Regs)	set (write) multiple register values	✓

- In the *Data Addr* data field, type the starting register.

Note that the data type is set automatically by WinMB, per the specified data address. Use the *Data Type* pull-down menu to select a different data type for these registers.

## NOTICE

To ensure best data type assignments, review a PC Config Report (see [Section 2.16.3](#) to view a live report; see [Section 7.1](#) to view a report file; see [Appendix A](#) for a sample report).

Table 10-5 Default Data Type per Register Range for SIM\_2251

Register Range	Default Type
1000 – 2999	Boolean
3000 – 4999	Integer
5000 – 6900	Long
7000 – 8999	Float

To select data types for SIM\_2251 registers 1000 to 9000, see [Section 10.3.2](#).

- In the *Quantity* data field, type the number of registers to be retrieved (range from 1 to 2016).

## NOTICE


Boolean registers are not user-defined (for either `SIM_2251` or `User_Modbus`) and primarily contain alarm flags useful for debugging. To view the contents of Boolean registers, select the “1 (Read Coil)” function code.

Numeric registers for `User_Modbus` can be user-defined (see [Section 5.18.4](#)). To view the contents of Numeric registers, select the “3 (Read Regs)” function code.

Note that the requested number of registers cannot exceed the amount contained by the selected message block but you can retrieve a partial block. You cannot cross a message block boundary.

Also note that in Standard Modbus mode each register is 16 bits. Therefore, integers (SHORT) consist of 1 register while floats (FLOAT) and long integers (LONG) consist of 2 registers.

5. Type the desired repeat count (how many times WinMB will read or set the specified registers before ceasing transmission) in the *Repeat* data box.

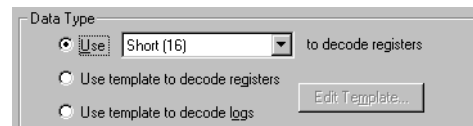
You can repeat the poll from 1 to 9999 times. A Repeat value of “-1” produces an infinite polling loop that can be terminated by clicking the  button.

### 10.3.1 Use Single Data Type

Use this function to assign a data type to a group of registers you will read or edit.

To poll a group of registers with the same user-defined data type,

1. Follow Steps 1 through 5 in [Section 10.3](#).
2. Click the *Use <Type> to decode registers* radio button to choose this option.



3. Use the Data Type pull-down menu to assign a data type to the selected registers (see [Section 10.3](#), Steps 3 and 4).

- Click the **Transmit** button to retrieve the selected registers (i.e., the specified data addresses) from the GC Controller (or other device).

Click the **Stop** button to cease transmission and return to the Modbus Function Selection options.

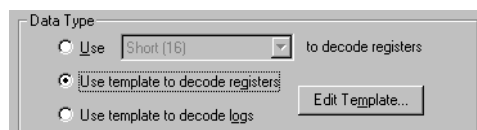
Note that the transmitted/received packet displays in the Packet Input-Output window.

### 10.3.2 Use Template (Mixed Data Types)

Use this function to create a new template or use an existing template file to directly decode Modbus register data retrieved from the GC Controller (or other device). Via the configuration of a given template, WinMB imposes the specified data types, etc., onto the incoming registers. The Template function is best used when decoding mixed data types.

To create a new template or use an existing template,

- Follow Steps 1 through 5 in [Section 10.3](#).
- Use the Data Type radio buttons to select the desired template option, to *decode registers* or *decode logs*.



- Note that the *Record No.* setting is now available. Enter the desired record by typing in the provided data field or using the scroll arrows.

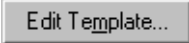


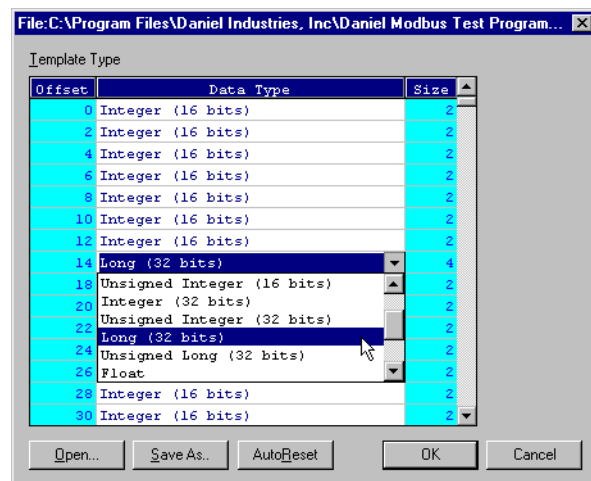


Table 10-6 Using Record Numbers with Templates

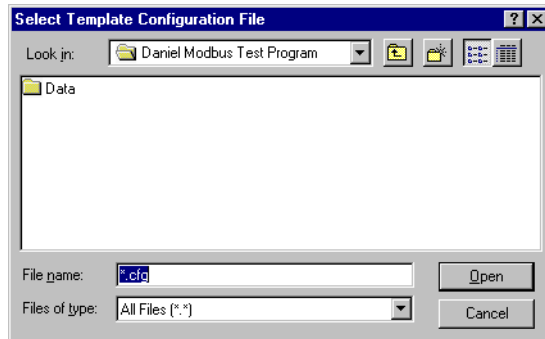
Data Type Setting	Other Setting(s)	Result
register template	<ul style="list-style-type: none"> <li>Enter <i>Data Addr</i> value.</li> <li>Enter <i>Record No.</i> value.</li> <li>Enter <i>Quantity</i> value.</li> </ul>	Read <b>Quantity</b> fields (i.e., the number of fields specified by the <b>Quantity</b> setting) from the specified <b>Record No.</b> of the register ( <b>Data Addr</b> ).
log template	<ul style="list-style-type: none"> <li>Enter <i>Record No.</i> value.</li> </ul>	Read all fields associated with the <b>Record No.</b>
	<ul style="list-style-type: none"> <li>Enter <i>Data Addr</i> value.</li> <li>Enter "0" for the <i>Record No.</i> value.</li> </ul>	Read all fields in all records for the specified log register ( <b>Data Addr</b> ).

To verify which record number should be entered, consult the Modbus specifications for your device. For more information on GC Modbus registers, see [Appendix F](#).

- Click the  button. The Template File dialog appears with a new template displayed.

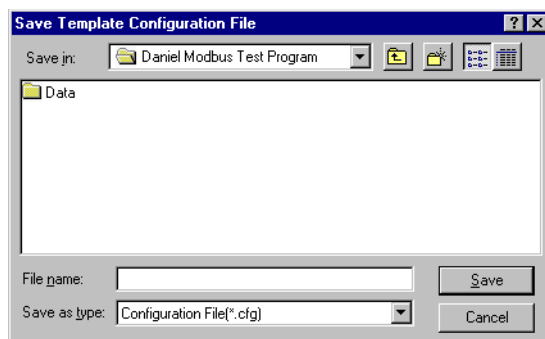


5. To open an existing template file, click the **Open...** button. The Select Template Configuration File dialog appears.




Use the directory tree to locate the desired file (e.g., temp1.cfg), highlight it, and then click the **Open** button.

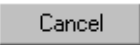
6. To edit the displayed file,
- Use the provided combo boxes to select a different data type. The Offset and Size values change to accommodate the data type.
  - Click the **AutoReset** button to change all template data types to the type last selected.
7. To save the displayed file to disk, click the **Save As..** button. The Select Template Configuration File dialog appears.



Use the directory tree to specify the desired location. Either select an existing file or type the new file name (e.g., temp2.cfg) in the *File name* data field. Then click the

 button.

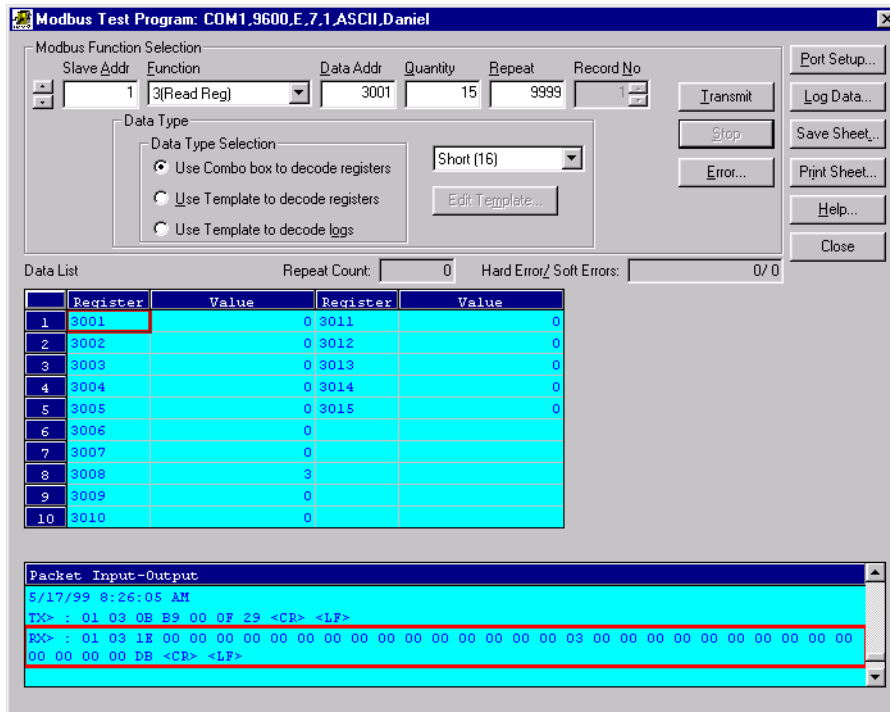
8. Click the  button to apply your selections and return to the main window.

Click the  button to return to the main window without applying your selections.

#### 10.4 USING MODBUS DATA

Use WinMB to poll the GC Controller Modbus registers (or, registers from another device), confirming that data is being accurately relayed from the GC Controller to the PC. Then, as necessary, assign data types to the returned data (see [Section 10.4.3](#)). You can save all settings to file for future reference.

To launch the WinMB program from MON2000, use the *File > Modbus Test* menu (see [Section 10.1](#) for additional options).



### 10.4.1 Set Log Parameters

The Log Data function allows you to log the polled data to a specified file.

To set the log parameters for WinMB,

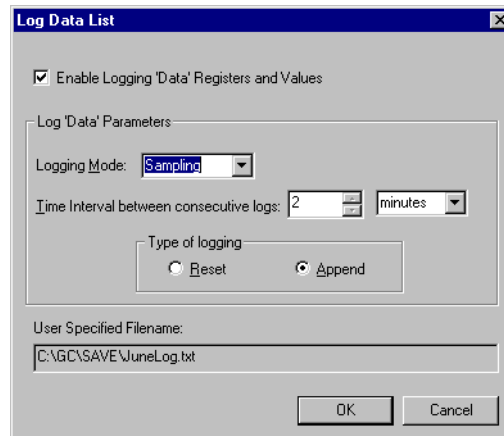
1. Click the **Log Data...** button to access the Log Data function. The Log Data List dialog appears.
2. Click the *Enable Logging* check box to turn this function ON and to access the Log Data Parameters.

## NOTICE

The Log Data function is not required for transmission of Modbus data.

To disable this function, deselect the *Enable Logging* check box.

- Use the *Logging Mode* pull-down menu to select either a *Sampling* or *Continuous* mode.




*Continuous* mode records the polled data continuously until the connection is terminated or the Log Data function is disabled (see Step 2).

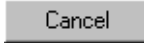
*Sampling* mode records the polled data per the user-defined Time Interval (e.g., every 2 minutes).

- Select the desired logging type.

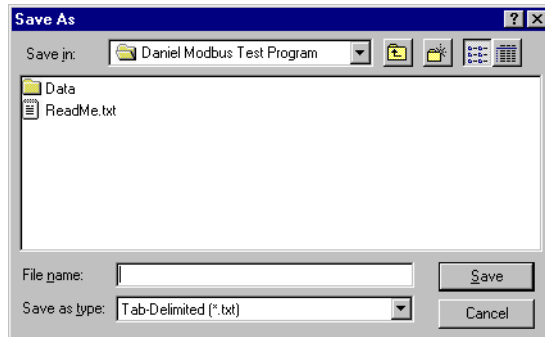
*Append* adds this log to the file specified, preserving previously logged data.

*Reset* deletes the previously logged data and saves only this new log.

- Click the  button to apply your selections and return to the main window. Go to Step 6.

Click the  button to return to the main window without applying your selections.

6. The Save As dialog appears.



Use the directory tree to specify the desired location and choose a format type. Either select an existing file or type the new file name in the *File name* data field.

7. Click the **Save** button to create this log file, apply your selections, and return to the main window.

Click the **Cancel** button to abort and return to the main window.

## NOTICE

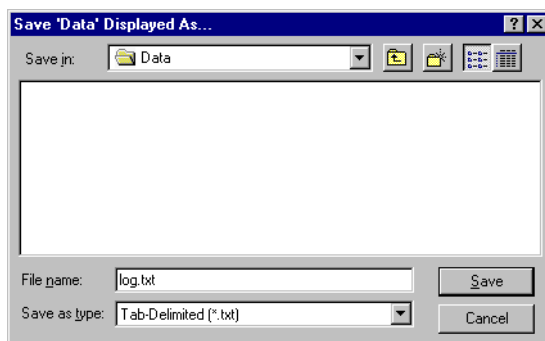
You can save log data in any of these formats:

- .txt, ASCII tab-delimited
- .xls, Excel
- .htm, HTML

### 10.4.2 Save Modbus Data

To save the data table in a separate file,

1. Click the **Save** button to access the Save Data function. The Save Data Displayed dialog appears.

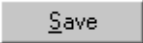


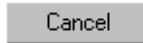
**NOTICE**

You can save log data in any of these formats:

- .txt, ASCII tab-delimited
- .xls, Excel
- .htm, HTML

2. Use the directory tree to specify the desired location and either select an existing file or type the new file name in the *File name* data field.

3. Click the  button to save this data and return to the main window.

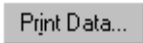
Click the  button to return to the main window without saving this data.

### 10.4.3 Assign Scale Ranges for User\_Modbus

This is an optional task that applies to applications using the User\_Modbus protocol. By assigning scale ranges, floating point data can be converted to integer values.

Use the Serial Ports, Edit Register List function to assign scale ranges. [See Section 5.18.4](#) for detailed instructions. [See Appendix F](#) for more information regarding GC Modbus registers.

### 10.4.4 Print Modbus Data

To print the transmitted data, click the  button. The standard Windows® print dialog appears.

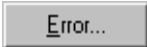
MON2000 prints the report to your configured printer ([see Section 3.7](#)).

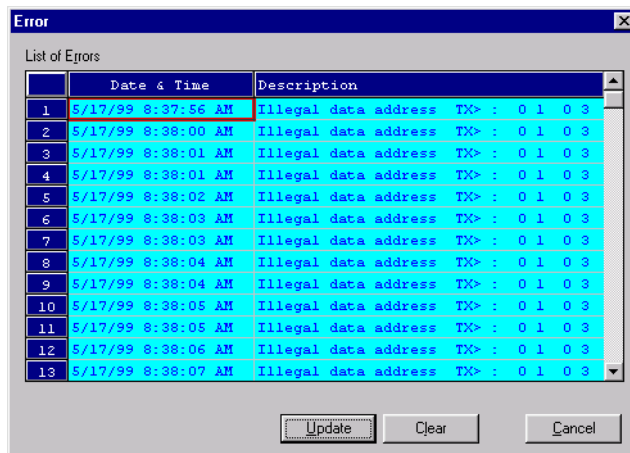
## 10.5 TROUBLESHOOTING COMMUNICATION ERRORS

The WinMB Communication Error Log is maintained in a circular buffer that holds up to 512 entries.

WinMB tracks the errors for a given session but does not store them. When you exit WinMB, all errors are cleared.

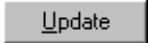
To view any communication errors that occurred during the data transfer, from the *File>Modbus Test* menu,

1. Click the  button to access the Communication Error Log function. The Error dialog appears.



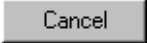
### NOTICE

Double-click a Description cell to "scroll through" the displayed text.

2. To view all errors that have occurred in this session, click the  button.

To delete all entries to date, click the

 button.

3. Click the  button to return to the main window.



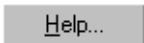
## 10.6 USING MODBUS TEST ONLINE HELP

Use the WinMB online help file to quickly access reference terminology, function descriptions, and other related information.

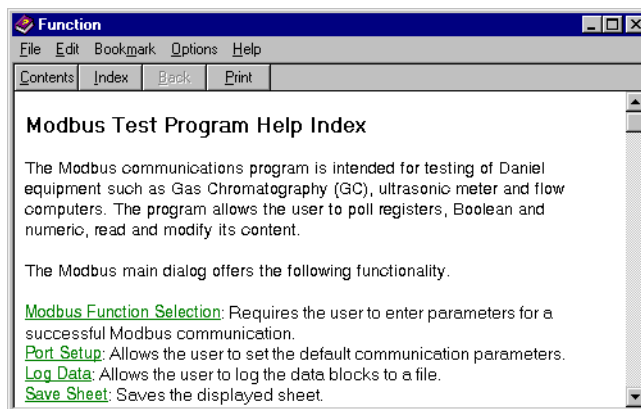
See the following sections for more information.

### 10.6.1 How to Access

To access online help, use the *File>Modbus Test* menu to display the Modbus Help test dialog, then,

- Press F1 on your PC keyboard
- Or,
- Click the  button located on the toolbar.

The Modbus Test Program Help Index displays.



## 10.6.2 How to Navigate

To navigate within this help file,

- Click the [Contents](#) button to display an index, a topic-tree contents menu, and a search function.
- Click the [Index](#) button to display an index where you can select a specific term.
- Click the [Back](#) button to return to the last topic viewed.
- Click the [Print](#) button to print the current topic.

Use the scroll bars and arrows to display more of a topic. You can also resize and/or move the topic window for better viewing convenience.

When applicable, a topic will contain links to other related topics. Use these links as you need.

## APPENDIX A, PC CONFIG REPORT

This appendix explains how to print a PC Config Report and provides an example for reference.

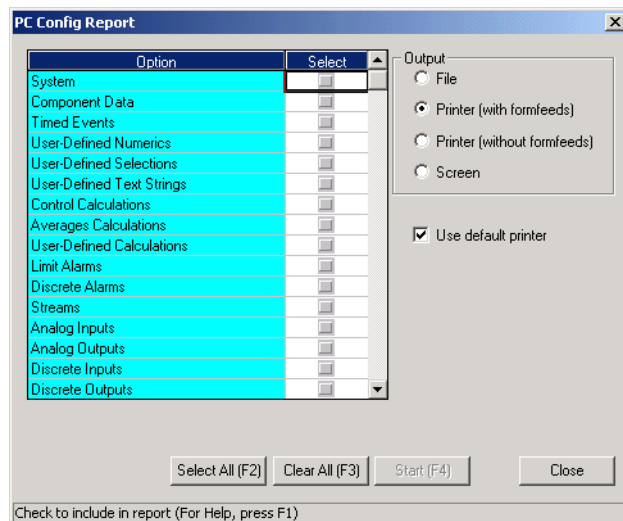
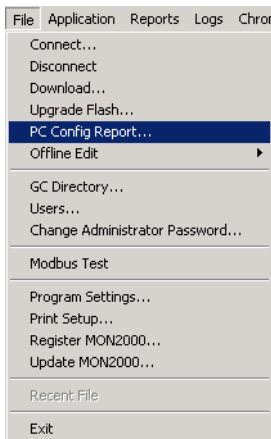
### NOTICE

Output data for the PC Config Report depends on the GC Controller and its application.

### A.1 HOW TO PRINT

Use the following instructions to print the current application settings for the online GC. To view a PC Config Report already saved to disk, see [Section 7.1.2](#).

1. Use the *File > PC Config Report* menu to access this function. The PC Config Report window appears.
2. Click the check boxes (see *Select* column) to choose the option you want included in the configuration report.




Click the **Select All (F2)** button or press the F2 key to select all options.

Click the **Clear All (F3)** button or press F3 to deselect (i.e., clear) all checked options.

3. Use the *Output* radio buttons to either save the report to disk, print the report with or without form feeds, or display on screen.

If you want to use the standard Windows® Print dialog to select a printer, uncheck the *Use default printer* option.

4. Click  the button or press the F4 key to generate your customized PC Config Report and print or save this file.

By default, if a print option is selected, MON2000 will print the report to your configured printer (see [Section 3.7](#)).

## NOTICE

If you are online with the GC Controller, a PC Config Report that includes all options can require up to 20 minutes to generate and save. Printing a full report can take longer.

If you press the ESC key, MON2000 will stop after the current option is completed.

## A.2 EXAMPLE REPORT

This example PC Config Report, on the following pages, represents a typical report that includes all sections. It is provided for reference only.

System Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

Description	Value
Stream Sequence	1
Aux. Stream Sequence	
Analyzer Name	2350_001
Unit Type	2350
System Description	2350 Standard 1 - 64 avgs
Chromatogram Buffers Size	21000
Max Peaks	64
Number of Valves	5
Daylight Saving Time	Normal
CGM Analog Output Config	0
Baseline Offset	12
CFG Baseline Number	1
Metric Base Conditions	Off
Max. Archive Averages	64
Max. Archive Avg. Records	64
CFG Revision Level	150
CFG Base Name	USASTD1

\*\*\*\*\*

6/2/2000 15:02:49

## Component Data Table #1

No.	Component	U/S	DetID	RetTime	Resp Factor	F/V	CalConc	AnalMthd
1	C6+ 47/35/17	STD	1	30.2	2013490	VAR	0.0289 %	AREA
2	PROPANE	STD	1	50.2	1316330	VAR	1.0 %	AREA
3	i-BUTANE	STD	1	65.7	1520820	VAR	0.3 %	AREA
4	n-BUTANE	STD	1	73.6	1545350	VAR	0.3 %	AREA
5	NEOPENTANE	STD	1	86.3	1651260	VAR	0.1 %	AREA
6	i-PENTANE	STD	1	109.4	1715050	VAR	0.0993 %	AREA
7	n-PENTANE	STD	1	121.6	1793230	VAR	0.0999 %	AREA
8	NITROGEN	STD	1	149.5	782820	VAR	2.5 %	AREA
9	METHANE	STD	1	153.1	637330	VAR	89.5719 %	AREA
10	CARBON DIOXIDE	STD	1	179.2	953088	VAR	1.0 %	AREA
11	ETHANE	STD	1	200.6	1060440	VAR	5.0 %	AREA

No.	Component	RTDev	SecDev	Updt	RFDev	GRSBTU	NETBTU	MolWgt	AGA8
1	C6+ 47/35/17	3	2	CAL	10	5288.7	4900.5	95.96	C6mix1
2	PROPANE	3	2	CAL	10	2521.9	2320.3	44.1	PROPANE
3	i-BUTANE	3	2	CAL	10	3259.4	3007.3	58.12	i-BUTANE
4	n-BUTANE	3	2	CAL	10	3269.8	3017.4	58.12	n-BUTANE
5	NEOPENTANE	3	3	CAL	10	3993.9	3691.4	72.15	i-PENTANE
6	i-PENTANE	3	4	CAL	10	4010.2	3707.6	72.15	i-PENTANE
7	n-PENTANE	3	4	CAL	10	4018.2	3715.5	72.15	n-PENTANE
8	NITROGEN	3	2	CAL	10	0	0	28.01	NITROGEN
9	METHANE	3	3	CAL	10	1012.3	911.5	16.04	METHANE
10	CARBON DIOXIDE	3	4	CAL	10	0	0	44.01	CO2
11	ETHANE	3	5	CAL	10	1773.7	1622.4	30.07	ETHANE

No.	Component	Lb/Gal	GPMFactor	Reid Vapor	RelDenGas	RelDenLqd
1	C6+ 47/35/17	5.6681	0.4462	3.0194	3.3132	0.68
2	PROPANE	4.227	0.2756	188.64	1.5226	0.507
3	i-BUTANE	4.693	0.3271	72.591	2.0068	0.5629
4	n-BUTANE	4.869	0.3153	51.709	2.0068	0.584
5	NEOPENTANE	4.975	0.383	35.9	2.4911	0.5967
6	i-PENTANE	5.206	0.3661	20.445	2.4912	0.6244
7	n-PENTANE	5.261	0.3622	15.574	2.4912	0.6311
8	NITROGEN	6.748	0.1096	0	0.9672	0.8094
9	METHANE	2.5	0.1695	5000	0.5539	0.3
10	CARBON DIOXIDE	6.82	0.1704	0	1.5196	0.818
11	ETHANE	2.97	0.2675	800	1.0382	0.3562

No.	Component	HVSupMJ/m3	HVInfMJ/m3	HVSupMJ/kg	HVInfMJ/kg	M_RelDens
1	C6+ 47/35/17	196.98	182.52	48.557	44.99	0.6803
2	PROPANE	93.936	86.42	50.368	46.34	0.5078
3	i-BUTANE	121.41	112.01	49.388	45.57	0.5635
4	n-BUTANE	121.79	112.4	49.546	45.72	0.5846
5	NEOPENTANE	148.76	137.49	48.75	45.06	0
6	i-PENTANE	149.36	138.09	48.949	45.25	0.6249
7	n-PENTANE	149.66	138.38	49.045	45.35	0.6316
8	NITROGEN	0	0	0	0	0.8093
9	METHANE	37.708	33.948	55.575	50.034	0.3
10	CARBON DIOXIDE	0	0	0	0	0.8227
11	ETHANE	66.065	60.43	51.95	47.52	0.3581

\*\*\*\*\*

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Timed Event Table #1

Analysis Time 225 Cycle Time 240 Sample Valve Y N N N N

---

Valve # 2	ON	@	0.0
Inhibit	ON 1	@	0.0
Valve # 3	ON	@	2.0
Slope Sens	8 1	@	3.0
Detector 1	6	@	4.0
Valve # 1	ON	@	5.0
Strm Switch		@	7.0
Peak Width	4 1	@	8.0
Valve # 1	OFF	@	10.0
Valve # 2	OFF	@	23.0
Inhibit	OFF 1	@	26.0
Inhibit	ON 1	@	36.0
Valve # 3	OFF	@	42.0
Inhibit	OFF 1	@	46.0
Inhibit	ON 1	@	97.0
Peak Width	8 1	@	100.0
Inhibit	OFF 1	@	101.0
Inhibit	ON 1	@	139.0
Detector 1	1	@	140.0
Valve # 3	ON	@	142.0
Peak Width	3 1	@	143.0
Inhibit	OFF 1	@	146.0
Detector 1	5	@	169.0
Inhibit	ON 1	@	170.0
Peak Width	8 1	@	173.0
Inhibit	OFF 1	@	174.0
Inhibit	ON 1	@	223.0

\*\*\*\*\*



User-Defined Numeric Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Name	Type	Value
-----	------	------	-------

-----  
No entries found.

\*\*\*\*\*

User-Defined Selection Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Name	Options
-----	------	---------

-----  
1 EnableCalMan 2  
2 EnableComAlm 2  
4 Maint\_mode 1  
5 Run\_Aux\_Seq 1

Options for EnableCalMan

-----  
No. Name

-----  
1 DISABLE  
2 ENABLE

Options for EnableComAlm

-----  
No. Name

-----  
1 DISABLE  
2 ENABLE\_NC  
3 ENABLE\_NO

Options for Maint\_mode

-----

No. Name

-----

1 OFF

2 ON

Options for Run\_Aux\_Seq

-----

No. Name

-----

1 OFF

2 ON

\*\*\*\*\*

User-Defined Text Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No. Name            Size Text

-----

1 rpt\_header1        50 Company: Daniel Industries

2 rpt\_header2        50

\*\*\*\*\*



HeatVal Inf Sat MJ/m3	N	N	N	N	N	N	N	N
HeatVal Inf Act MJ/m3	N	N	N	N	N	N	N	N
HeatVal Sup Dry MJ/kg	N	N	N	N	N	N	N	N
HeatVal Inf Dry MJ/kg	N	N	N	N	N	N	N	N
HeatVal Sup Dry Kc/m3	N	N	N	N	N	N	N	N
HeatVal Sup Sat Kc/m3	N	N	N	N	N	N	N	N
HeatVal Sup Act Kc/m3	N	N	N	N	N	N	N	N
HeatVal Inf Dry Kc/m3	N	N	N	N	N	N	N	N
HeatVal Inf Sat Kc/m3	N	N	N	N	N	N	N	N
HeatVal Inf Act Kc/m3	N	N	N	N	N	N	N	N
HeatVal Sup Dry Kc/kg	N	N	N	N	N	N	N	N
HeatVal Inf Dry Kc/kg	N	N	N	N	N	N	N	N
Metric Rel Dens Lqd	N	N	N	N	N	N	N	N
Metric Gas Density	N	N	N	N	N	N	N	N
Metric Lqd Density	N	N	N	N	N	N	N	N

\*\*\*\*\*

Calculation Average Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

Resets

Time: 00:00

Weekday: Sun

Day of Month: 1

No. Variable Name S C

-----  
Hourly

No entries found.

24 Hour

No entries found.

Weekly

No entries found.

Monthly

No entries found.

Variable

No entries found.

\*\*\*\*\*

Calculation User-Defined Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Variable	S	C
-----			
1	label 1		
	Avg. Molecular Weight	1	1
	+ Gallons/1000 SCF	1	1
	* Gas Density lbm/1000 ft3	1	1
	/ Heating Value Gross BTU Dry	1	1
	- Mole Percent	1	1
2	label 2		
	Gallons/1000 SCF	1	2
	+ Gallons/1000 SCF	1	3
	+ User Calc Result	1	1
	+ Value 1: 16.2	1	1

\*\*\*\*\*

Limit Alarms Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Variable	S	C	DO	Type
-----					
No entries found.					

\*\*\*\*\*

Discrete Alarms Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

Alarm No.	Discrete Input	Discrete Output	Alarm Message
-----			
1	0	0	
2	0	0	
3	0	0	
4	0	0	
5	0	0	

\*\*\*\*\*

Streams Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Name	Use Det	CD	TE	Tot	Avg	Cal Data			Base Condition		
							Start	Int	Auto	PSIA	°F	
1	Stream 1	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
2	Stream 2	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
3	Stream 3	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
4	Stream 4	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
5	Stream 5	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
6	Stream 6	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
7	Stream 7	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60
8	Stream 8	ANL Det1	1	1	5	3	07:00	24	Y	Y	14.73	60

No calibration streams defined

Optional Base Pressures

No.	Name	Op Base Pres 1	Op Base Pres 2	Op Base Pres 3
1	Stream 1	0	0	0
2	Stream 2	0	0	0
3	Stream 3	0	0	0
4	Stream 4	0	0	0
5	Stream 5	0	0	0
6	Stream 6	0	0	0
7	Stream 7	0	0	0
8	Stream 8	0	0	0

\*\*\*\*\*

Analog Input Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Label	Zero Scale	Full Scale F/V	Fixed Value
1	AI 1	0	100 VAR	0

\*\*\*\*\*

Analog Output Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Variable	S	C
1	Mole Percent	1	1

No.	Zero Scale	Full Scale F/V	Fixed Value
1	0	100 VAR	0

Bargraph

No.	Variable	Streams	Component
1	Mole Percent	1	1
2	Not Used		1
3	Not Used		1
4	Not Used		1
5	Not Used		1
6	Not Used		1
7	Not Used		1
8	Not Used		1
9	Not Used		1
10	Not Used		1
11	Not Used		1
12	Not Used		1
13	Not Used		1
14	Not Used		1
15	Not Used		1
16	Not Used		1

Scaling Values

No.	Zero Scale	Full Scale
-----	------------	------------

---

1	0	100
2	0	100
3	0	100
4	0	100
5	0	100
6	0	100
7	0	100
8	0	100
9	0	100
10	0	100
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0

\*\*\*\*\*

Discrete Input Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Label	Switch
-----	-------	--------

---

1	DI 1	AUTO
2	DI 2	AUTO
3	DI 3	AUTO
4	DI 4	AUTO
5	AUX_STRM_SEQ	AUTO

\*\*\*\*\*



Discrete Output Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Label	Switch	On-Time	Off-Time
1	DO 1	AUTO	00:00	00:00
2	DO 2	AUTO	00:00	00:00
3	DO 3	AUTO	00:00	00:00
4	Common_Alarm	AUTO	00:00	00:00
5	Calib-Maint	AUTO	00:00	00:00

\*\*\*\*\*

Valve Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Label	Switch
1	Valve 1	AUTO
2	Valve 2	AUTO
3	Valve 3	AUTO
4	Valve 4	AUTO
5	Valve 5	AUTO

\*\*\*\*\*

Serial Port Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

Port Usage		Baud Rate	Data Bits	Stop Bits	Parity	Hand-shaking	RTS ON	RTS OFF	RTS Protocol	Comm ID	Read Write
		Rate	Bits	Bits						ID	Write
1	USER_MODBUS	9600	8	1	None	None	0	0	RTU	0	RW
2	SIM_2251	9600	8	1	None	None	0	0	RTU	3	RW
3	PC	9600	8	1	None	None	0	0	RTU	0	RW
4	PC	9600	8	1	None	None	0	0	RTU	0	RW

\*\*\*\*\*

Global Data Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No.	Variable name	Indices		Type	No. of Chars.
		S	C		
1	cal_run_num	1	1	Integer	
2	sim_abtu	1	1	Float	
3	sim_alarm	16	1	Integer	
4	sim_anlytime	1	1	Integer	
5	sim_cal	1	1	Integer	
6	sim_cal_abtu	1	1	Float	
7	sim_cal_comp	1	1	Float	
8	sim_cal_dbtu	1	1	Float	
9	sim_cal_gpm	1	1	Float	
10	sim_cal_rden	1	1	Float	
11	sim_cal_sbtu	1	1	Float	
12	sim_cal_unno	1	1	Float	
13	sim_cal_wobb	1	1	Float	
14	sim_calcycle	1	1	Long	
15	sim_char	1	1	Char	1
16	sim_compno	16	4	Integer	
17	sim_compress	1	1	Float	
18	sim_cycday	1	1	Integer	
19	sim_cychour	1	1	Integer	
20	sim_cycmin	1	1	Integer	
21	sim_cycmonth	1	1	Integer	
22	sim_cyctime	1	1	Long	
23	sim_cycyear	1	1	Integer	
24	sim_day	1	1	Integer	

25	sim_dbtu	1	1	Float
26	sim_dummy	4	1	Float
27	sim_gpmwt	16	4	Float
28	sim_hour	1	1	Integer
29	sim_min	1	1	Integer
30	sim_molpct	16	4	Float
31	sim_month	1	1	Integer
32	sim_newdata	1	1	Integer
33	sim_rden_gas	1	1	Float
34	sim_rf	16	4	Float
35	sim_sbtu	1	1	Float
36	sim_smask	1	1	Integer
37	sim_stream	1	1	Integer
38	sim_totgpm	1	1	Float
39	sim_unnormal	1	1	Float
40	sim_wobbe	1	1	Float
41	sim_year	1	1	Integer

\*\*\*\*\*

Streams Data Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No. Structure Name No. of Streams

-----

No entries found.

\*\*\*\*\*

Component Data Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No. Structure Name No. of Streams No. of Components  
per Stream

-----  
No entries found.

\*\*\*\*\*

Data Files Report from 2350\_001 2350\_001.BIN

6/2/2000 15:02:49

No. File Name No. of Records

-----  
1 Event\_Log 240

File Name Event\_Log

-----  
No. Field Name Type No. of Chars.

-----  
1 date Float  
2 time Float  
3 operator\_id Char 4  
4 event\_id Float  
5 ASCII\_text Char 60  
6 prev\_value Float  
7 curr\_value Float

\*\*\*\*\*

6/2/2000 15:02:49

No.	Name	Page Width	Page Length	Left Margin	Right Margin	Top Margin	Bottom Margin
1	Analysis	150	55	0	0	0	0
2	Raw Data	80	55	1	0	0	0
3	Calibration	80	55	1	0	0	0
4	Final Calib	80	55	1	0	0	0
5	Hourly Avg	80	55	0	0	0	0
6	24 Hour Avg	80	55	0	0	0	0
7	Weekly Avg	80	55	0	0	0	0
8	Monthly Avg	80	55	0	0	0	0
9	Variable Avg	80	55	0	0	0	0

Field List used in Analysis

Type	Variable	SubField Name	Indices	CP Flag
STRING				0
STRING				0
DATE				
DATE				
STRING				0
VARIABLE	stream_data	anly_time	STREAM_NO	1 0
STRING				0
VARIABLE	stream_data	cycl_time	STREAM_NO	1 0
STRING				0
VARIABLE	stream_data	stream_num	STREAM_NO	1 0
VARIABLE	strms	name	STREAM_NO	1 0
STRING				0
VARIABLE	stream_data	run_mode	STREAM_NO	1 0

STRING						0
TIME VAR	stream_data	cycl_strt_tm	STREAM_NO	1		0
STRING						0
VARIABLE	analyzr_name			1	1	0
STRING						0
VARIABLE	seqtxt		DET NO	1		0
VARIABLE	rpt_header1			1	1	0
VARIABLE	rpt_header2			1	1	0
TABLE						2
TVAR	cdt	stdusr	CDT_TBL_NO	1*		0
TVAR	cdt	compnam	CDT_TBL_NO	1*		0
TVAR	analysis	molpct	STREAM_NO	1*		25
TVAR	analysis	wtpct	STREAM_NO	1*		26
TVAR	analysis	liqvolpct	STREAM_NO	1*		27
TVAR	analysis	gpm	STREAM_NO	1*		28
TVAR	analysis	btu_gross	STREAM_NO	1*		29
TVAR	analysis	btu_net	STREAM_NO	1*		30
TVAR	analysis	rel_den_gas	STREAM_NO	1*		31
TVAR	analysis	superior_m3	STREAM_NO	1*		54
TVAR	analysis	inferior_m3	STREAM_NO	1*		55
TVAR	analysis	superior_kg	STREAM_NO	1*		56
TVAR	analysis	inferior_kg	STREAM_NO	1*		57
STRING						0
VARIABLE	stream_data	totl_mole	STREAM_NO	1		0
VARIABLE	stream_data	totl_molwgt	STREAM_NO	1		0
VARIABLE	stream_data	totl_liqvol	STREAM_NO	1		0
VARIABLE	stream_data	totl_gpmc2	STREAM_NO	1		0
VARIABLE	stream_data	totl_btugros	STREAM_NO	1		0
VARIABLE	stream_data	totl_btu_net	STREAM_NO	1		0
VARIABLE	stream_data	totl_rd_gas	STREAM_NO	1		0
VARIABLE	stream_data	totl_sm3_dry	STREAM_NO	1		0
VARIABLE	stream_data	totl_im3_dry	STREAM_NO	1		0
VARIABLE	stream_data	totl_skg_dry	STREAM_NO	1		0

VARIABLE	stream_data	totl_ikg_dry	STREAM_NO	1	0
	STRING				0
	STRING				32
VARIABLE	strms	base_pres	STREAM_NO	1	0
	STRING				250
	STRING				251
VARIABLE	strms	base_temp	STREAM_NO	1	0
	STRING				32
	STRING				250
	STRING				251
	STRING				32
VARIABLE	stream_data	z_factor	STREAM_NO	1	0
	STRING				0
VARIABLE	strms	base_pres	STREAM_NO	1	0
VARIABLE	op_pressures		STREAM_NO	1	0
VARIABLE	op_pressures		STREAM_NO	2	0
VARIABLE	op_pressures		STREAM_NO	3	0
	STRING				0
	STRING				81
	STRING				82
	STRING				83
	STRING				29
	STRING				29
VARIABLE	stream_data	btudry_gross	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	13	0
VARIABLE	op_pres_calc		STREAM_NO	25	0
	STRING				43
	STRING				39
	STRING				39
VARIABLE	stream_data	btusat_gross	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	2	0
VARIABLE	op_pres_calc		STREAM_NO	14	0

VARIABLE	op_pres_calc		STREAM_NO	26	0
STRING					44
STRING					40
STRING					40
VARIABLE	stream_data	btuact_gross	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	3	0
VARIABLE	op_pres_calc		STREAM_NO	15	0
VARIABLE	op_pres_calc		STREAM_NO	27	0
STRING					52
STRING					30
STRING					30
VARIABLE	stream_data	btu_dry_net	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	4	0
VARIABLE	op_pres_calc		STREAM_NO	16	0
VARIABLE	op_pres_calc		STREAM_NO	28	0
STRING					45
STRING					41
STRING					41
VARIABLE	stream_data	btu_sat_net	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	5	0
VARIABLE	op_pres_calc		STREAM_NO	17	0
VARIABLE	op_pres_calc		STREAM_NO	29	0
STRING					46
STRING					42
STRING					42
VARIABLE	stream_data	btu_act_net	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	6	0
VARIABLE	op_pres_calc		STREAM_NO	18	0
VARIABLE	op_pres_calc		STREAM_NO	30	0
STRING					53
STRING					47
VARIABLE	stream_data	totl_gpmc2	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	8	0



VARIABLE	op_pres_calc		STREAM_NO	20	0
VARIABLE	op_pres_calc		STREAM_NO	32	0
STRING					48
VARIABLE	stream_data	totl_gpmc3	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	9	0
VARIABLE	op_pres_calc		STREAM_NO	21	0
VARIABLE	op_pres_calc		STREAM_NO	33	0
STRING					49
VARIABLE	stream_data	totl_gpmc4	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	10	0
VARIABLE	op_pres_calc		STREAM_NO	22	0
VARIABLE	op_pres_calc		STREAM_NO	34	0
STRING					50
VARIABLE	stream_data	totl_gpmc5	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	11	0
VARIABLE	op_pres_calc		STREAM_NO	23	0
VARIABLE	op_pres_calc		STREAM_NO	35	0
STRING					51
VARIABLE	stream_data	totl_gpmc6	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	12	0
VARIABLE	op_pres_calc		STREAM_NO	24	0
VARIABLE	op_pres_calc		STREAM_NO	36	0
STRING					59
VARIABLE	stream_data	sup_m3_dry	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	13	0
VARIABLE	op_pres_calc		STREAM_NO	25	0
STRING					156
STRING					60
VARIABLE	stream_data	sup_m3_sat	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	2	0
VARIABLE	op_pres_calc		STREAM_NO	14	0
VARIABLE	op_pres_calc		STREAM_NO	26	0

STRING					157
STRING					61
VARIABLE	stream_data	sup_m3_act	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	3	0
VARIABLE	op_pres_calc		STREAM_NO	15	0
VARIABLE	op_pres_calc		STREAM_NO	28	0
STRING					158
STRING					62
VARIABLE	stream_data	inf_m3_dry	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	4	0
VARIABLE	op_pres_calc		STREAM_NO	16	0
VARIABLE	op_pres_calc		STREAM_NO	28	0
STRING					159
STRING					63
VARIABLE	stream_data	inf_m3_sat	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	5	0
VARIABLE	op_pres_calc		STREAM_NO	17	0
VARIABLE	op_pres_calc		STREAM_NO	29	0
STRING					181
STRING					64
VARIABLE	stream_data	inf_m3_act	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	6	0
VARIABLE	op_pres_calc		STREAM_NO	18	0
VARIABLE	op_pres_calc		STREAM_NO	30	0
STRING					182
STRING					65
VARIABLE	stream_data	sup_kg_dry	STREAM_NO	1	0
STRING					182
STRING					66
VARIABLE	stream_data	inf_kg_dry	STREAM_NO	1	0
STRING					184
STRING					67
VARIABLE	stream_data	sdry_kcal_m3	STREAM_NO	1	0

VARIABLE	op_pres_calc		STREAM_NO	9	0
VARIABLE	op_pres_calc		STREAM_NO	21	0
VARIABLE	op_pres_calc		STREAM_NO	33	0
STRING					185
STRING					68
VARIABLE	stream_data	ssat_kcal_m3	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	7	0
VARIABLE	op_pres_calc		STREAM_NO	19	0
VARIABLE	op_pres_calc		STREAM_NO	31	0
STRING					186
STRING					69
VARIABLE	stream_data	sact_kcal_m3	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	8	0
VARIABLE	op_pres_calc		STREAM_NO	20	0
VARIABLE	op_pres_calc		STREAM_NO	32	0
STRING					187
STRING					70
VARIABLE	stream_data	idry_kcal_m3	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	10	0
VARIABLE	op_pres_calc		STREAM_NO	22	0
VARIABLE	op_pres_calc		STREAM_NO	34	0
STRING					188
STRING					71
VARIABLE	stream_data	isat_kcal_m3	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	11	0
VARIABLE	op_pres_calc		STREAM_NO	23	0
VARIABLE	op_pres_calc		STREAM_NO	35	0
STRING					189
STRING					72
VARIABLE	stream_data	iact_kcal_m3	STREAM_NO	1	0
VARIABLE	op_pres_calc		STREAM_NO	12	0
VARIABLE	op_pres_calc		STREAM_NO	24	0
VARIABLE	op_pres_calc		STREAM_NO	36	0

STRING					190
STRING					73
VARIABLE	stream_data	sdry_kcal_kg	STREAM_NO	1	0
STRING					191
STRING					74
VARIABLE	stream_data	idry_kcal_kg	STREAM_NO	1	0
STRING					192
STRING					31
VARIABLE	stream_data	real_rd_gas	STREAM_NO	1	0
STRING					34
VARIABLE	stream_data	real_rd_lqd	STREAM_NO	1	0
STRING					58
VARIABLE	stream_data	rden_lqd_15	STREAM_NO	1	0
STRING					58
STRING					33
VARIABLE	stream_data	totl_unrml	STREAM_NO	1	0
STRING					77
VARIABLE	stream_data	avg_molwgt	STREAM_NO	1	0
STRING					35
STRING					35
VARIABLE	stream_data	wobbe	STREAM_NO	1	0
STRING					36
STRING					36
VARIABLE	stream_data	gas_density	STREAM_NO	1	0
STRING					36
STRING					75
VARIABLE	stream_data	gas_dens_m3	STREAM_NO	1	0
STRING					75
STRING					37
VARIABLE	stream_data	lqd_density	STREAM_NO	1	0
STRING					37
STRING					76
VARIABLE	stream_data	lqd_dens_m3	STREAM_NO	1	0

STRING					76
STRING					38
VARIABLE	stream_data	reid_vapor	STREAM_NO	1	0
STRING					38
TABLE					200
TVAR	anlin	label	1*	1	0
TVAR	aincur		1*	1	0
STRING					160
TABLE					160
TVAR	calcs	label	1*	1	0
TVAR	calcval		1*	1	0

\* indicates index is incremented.

Field List used in Raw Data

-----

Type	Variable	SubField Name	Indices	CP Flag	
STRING				0	
STRING				0	
DATE					
DATE					
STRING				0	
VARIABLE	stream_data	anly_time	STREAM_NO	1	0
STRING					0
VARIABLE	stream_data	cycl_time	STREAM_NO	1	0
STRING					0
VARIABLE	stream_data	stream_num	STREAM_NO	1	0
VARIABLE	strms	name	STREAM_NO	1	0
STRING					0
VARIABLE	stream_data	run_mode	STREAM_NO	1	0
STRING					0
TIME VAR	stream_data	cycl_strt_tm	STREAM_NO	1	0
STRING					0

VARIABLE	anlyzr_name			1	1	0
STRING						0
VARIABLE	seqtxt		DET_NO		1	0
VARIABLE	rpt_header1			1	1	0
VARIABLE	rpt_header2			1	1	0
TABLE						50
TVAR	raw_data	peak_num	STREAM_NO		1*	21
TVAR	raw_data	rt	STREAM_NO		1*	21
TVAR	raw_data	area	STREAM_NO		1*	21
TVAR	raw_data	height	STREAM_NO		1*	21
TVAR	raw_data	detector	STREAM_NO		1*	21
TVAR	raw_data2	method	STREAM_NO		1*	21
TVAR	raw_data3	startint	STREAM_NO		1*	21
TVAR	raw_data3	endint	STREAM_NO		1*	21
TVAR	raw_data3	half_height	STREAM_NO		1*	21

\* indicates index is incremented.

Field List used in Calibration

-----

Type	Variable	SubField Name	Indices	CP Flag
STRING				0
STRING				0
VARIABLE	cal_run_num		1 1	0
STRING				0
VARIABLE	strms	nrun	STREAM_NO 1	0
STRING				0
DATE				
DATE				
STRING				0
VARIABLE	stream_data	anly_time	STREAM_NO 1	0
STRING				0
VARIABLE	stream_data	cycl_time	STREAM_NO 1	0

STRING					0
VARIABLE	stream_data	stream_num	STREAM_NO	1	0
VARIABLE	strms	name	STREAM_NO	1	0
STRING					0
VARIABLE	stream_data	run_mode	STREAM_NO	1	0
STRING					0
TIME VAR	stream_data	cycl_strt_tm	STREAM_NO	1	0
STRING					0
VARIABLE	analyzr_name		1	1	0
STRING					0
VARIABLE	seqtxt		DET NO	1	0
VARIABLE	rpt_header1		1	1	0
VARIABLE	rpt_header2		1	1	0
TABLE					2
TVAR	cdt	compnam	CDT_TBL_NO	1*	0
TVAR	cdt	cal_conc	CDT_TBL_NO	1*	0
TVAR	cal_avgs	raw	STREAM_NO	1*	0
TVAR	cal_avgs	rf	STREAM_NO	1*	0
TVAR	cal_avgs	rfdev	STREAM_NO	1*	0
TVAR	cal_avgs	rt	STREAM_NO	1*	0
TVAR	cal_avgs	rtdev	STREAM_NO	1*	0
ALARMS					0

\* indicates index is incremented.

Field List used in Final Calib

-----

Type	Variable	SubField Name	Indices	CP Flag
STRING				0
STRING				0
DATE				
DATE				
STRING				0
VARIABLE	stream_data	anly_time	STREAM_NO 1	0
STRING				0
VARIABLE	stream_data	cycl_time	STREAM_NO 1	0
STRING				0
VARIABLE	stream_data	stream_num	STREAM_NO 1	0
VARIABLE	strms	name	STREAM_NO 1	0
STRING				0
VARIABLE	stream_data	run_mode	STREAM_NO 1	0
STRING				0
TIME VAR	stream_data	cycl_strt_tm	STREAM_NO 1	0
STRING				0
VARIABLE	anlyzr_name		1 1	0
STRING				0
VARIABLE	seqtxt		DET NO 1	0
VARIABLE	rpt_header1		1 1	0
VARIABLE	rpt_header2		1 1	0
TABLE				2
TVAR	cdt	compnam	CDT_TBL_NO 1*	0
TVAR	cdt	cal_conc	CDT_TBL_NO 1*	0
TVAR	cal_results	oldrf	STREAM_NO 1*	0
TVAR	cal_results	newrf	STREAM_NO 1*	0
TVAR	cal_results	updated	STREAM_NO 1*	0



TVAR	cal_results	rfdev	STREAM_NO	1*	0
TVAR	cal_results	oldrt	STREAM_NO	1*	0
TVAR	cal_results	newrt	STREAM_NO	1*	0
TVAR	cal_results	updated	STREAM_NO	1*	0
TVAR	cal_results	rtdev	STREAM_NO	1*	0
ALARMS					0

\* indicates index is incremented.

Field List used in Hourly Avg

-----

Type	Variable	SubField Name	Indices		CP Flag
STRING					0
STRING					0
VARIABLE	analyzr_name		1	1	0
VARIABLE	rpt_header1		1	1	0
VARIABLE	rpt_header2		1	1	0
VARIABLE	avg_data	number	1*	1	0
VARIABLE	avg_data	label	1*	1	0
STRING					0
VARIABLE	avg_data	s	1*	1	0
STRING					129
VARIABLE	avg_data	c	1*	1	0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
VARIABLE	avg_archive1	avg	1*	1	0
VARIABLE	avg_archive1	minimum	1*	1	0
VARIABLE	avg_archive1	maximum	1*	1	0

VARIABLE	avg_archive2		1*	1	0
STRING					0
VARIABLE	avg_archive1	avg	1*	2	0
VARIABLE	avg_archive1	minimum	1*	2	0
VARIABLE	avg_archive1	maximum	1*	2	0
VARIABLE	avg_archive2		1*	2	0
STRING					0
VARIABLE	avg_archive1	avg	1*	3	0
VARIABLE	avg_archive1	minimum	1*	3	0
VARIABLE	avg_archive1	maximum	1*	3	0
VARIABLE	avg_archive2		1*	3	0

\* indicates index is incremented.

Field List used in 24 Hour Avg

-----

Type	Variable	SubField Name	Indices	CP Flag	
STRING				0	
STRING				0	
VARIABLE	anlyzr_name		1	1	0
VARIABLE	rpt_header1		1	1	0
VARIABLE	rpt_header2		1	1	0
VARIABLE	avg_data	number	1*	1	0
VARIABLE	avg_data	label	1*	1	0
STRING				0	
VARIABLE	avg_data	s	1*	1	0
STRING				129	
VARIABLE	avg_data	c	1*	1	0
STRING				0	
STRING				0	
STRING				0	
STRING				0	
STRING				0	

STRING					0
STRING					0
VARIABLE	avg_archive1	avg	1*	1	0
VARIABLE	avg_archive1	minimum	1*	1	0
VARIABLE	avg_archive1	maximum	1*	1	0
VARIABLE	avg_archive2		1*	1	0
STRING					0
VARIABLE	avg_archive1	avg	1*	2	0
VARIABLE	avg_archive1	minimum	1*	2	0
VARIABLE	avg_archive1	maximum	1*	2	0
VARIABLE	avg_archive2		1*	2	0
STRING					0
VARIABLE	avg_archive1	avg	1*	3	0
VARIABLE	avg_archive1	minimum	1*	3	0
VARIABLE	avg_archive1	maximum	1*	3	0
VARIABLE	avg_archive2		1*	3	0

\* indicates index is incremented.

Field List used in Weekly Avg

-----

Type	Variable	SubField Name	Indices	CP Flag	
STRING				0	
STRING				0	
VARIABLE	analyzr_name		1	1	0
VARIABLE	rpt_header1		1	1	0
VARIABLE	rpt_header2		1	1	0
VARIABLE	avg_data	number	1*	1	0
VARIABLE	avg_data	label	1*	1	0
STRING				0	
VARIABLE	avg_data	s	1*	1	0
STRING				129	

VARIABLE	avg_data	c	1*	1	0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
VARIABLE	avg_archive1	avg	1*	1	0
VARIABLE	avg_archive1	minimum	1*	1	0
VARIABLE	avg_archive1	maximum	1*	1	0
VARIABLE	avg_archive2		1*	1	0
STRING					0
VARIABLE	avg_archive1	avg	1*	2	0
VARIABLE	avg_archive1	minimum	1*	2	0
VARIABLE	avg_archive1	maximum	1*	2	0
VARIABLE	avg_archive2		1*	2	0
STRING					0
VARIABLE	avg_archive1	avg	1*	3	0
VARIABLE	avg_archive1	minimum	1*	3	0
VARIABLE	avg_archive1	maximum	1*	3	0
VARIABLE	avg_archive2		1*	3	0

\* indicates index is incremented.

Field List used in Monthly Avg

-----

Type	Variable	SubField Name	Indices	CP Flag	
STRING				0	
STRING				0	
VARIABLE	analyzr_name		1	1	0
VARIABLE	rpt_header1		1	1	0
VARIABLE	rpt_header2		1	1	0

VARIABLE	avg_data	number	1*	1	0
VARIABLE	avg_data	label	1*	1	0
STRING					0
VARIABLE	avg_data	s	1*	1	0
STRING					129
VARIABLE	avg_data	c	1*	1	0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
VARIABLE	avg_archive1	avg	1*	1	0
VARIABLE	avg_archive1	minimum	1*	1	0
VARIABLE	avg_archive1	maximum	1*	1	0
VARIABLE	avg_archive2		1*	1	0
STRING					0
VARIABLE	avg_archive1	avg	1*	2	0
VARIABLE	avg_archive1	minimum	1*	2	0
VARIABLE	avg_archive1	maximum	1*	2	0
VARIABLE	avg_archive2		1*	2	0
STRING					0
VARIABLE	avg_archive1	avg	1*	3	0
VARIABLE	avg_archive1	minimum	1*	3	0
VARIABLE	avg_archive1	maximum	1*	3	0
VARIABLE	avg_archive2		1*	3	0

\* indicates index is incremented.

Field List used in Variable Avg

-----

Type	Variable	SubField Name	Indices		CP Flag
STRING					0
STRING					0
VARIABLE	anlyzr_name		1	1	0
VARIABLE	rpt_header1		1	1	0
VARIABLE	rpt_header2		1	1	0
VARIABLE	avg_data	number	1*	1	0
VARIABLE	avg_data	label	1*	1	0
STRING					0
VARIABLE	avg_data	s	1*	1	0
STRING					129
VARIABLE	avg_data	c	1*	1	0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
STRING					0
VARIABLE	avg_archive1	avg	1*	1	0
VARIABLE	avg_archive1	minimum	1*	1	0
VARIABLE	avg_archive1	maximum	1*	1	0
VARIABLE	avg_archive2		1*	1	0
STRING					0
VARIABLE	avg_archive1	avg	1*	2	0
VARIABLE	avg_archive1	minimum	1*	2	0
VARIABLE	avg_archive1	maximum	1*	2	0
VARIABLE	avg_archive2		1*	2	0
STRING					0
VARIABLE	avg_archive1	avg	1*	3	0
VARIABLE	avg_archive1	minimum	1*	3	0
VARIABLE	avg_archive1	maximum	1*	3	0
VARIABLE	avg_archive2		1*	3	0

\* indicates index is incremented.

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6/2/2000 15:02:49

Slave Name	Slave ID	Slave Type
USER_MODBUS	0	PLC Emulation - Low-Hi
SIM_2251	3	Daniel 2500 Emulation

USER\_MODBUS

Modbus Reg.	Variable Name	Field Name	Indices S	Indices C	Data Type	String Length	Override Keylock?
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Boolean(Coils)

0	sysalarm_set		1	1	Application Checksum Failure		No
1	sysalarm_set		2	1	ROM Checksum Failure		No
2	sysalarm_set		3	1	RAM Diagnostics Failure		No
3	sysalarm_set		4	1	A/D Converter Failure		No
4	sysalarm_set		5	1	Detector Oven Failure		No
5	sysalarm_set		6	1	Liquid Sample Valve Heater Failure		No
6	sysalarm_set		7	1	Sample System Oven Failure		No
7	sysalarm_set		8	1	Catalytic Converter Failure		No
8	sysalarm_set		9	1	Heater 5 Failure		No
9	sysalarm_set		10	1	Heater 6 Failure		No
10	sysalarm_set		11	1	Heater 1 Controller Failure		No
11	sysalarm_set		12	1	Heater 2 Controller Failure		No
12	sysalarm_set		13	1	Heater 3 Controller Failure		No
13	sysalarm_set		14	1	Heater 4 Controller Failure		No
14	sysalarm_set		15	1	Heater 5 Controller Failure		No
15	sysalarm_set		16	1	Heater 6 Controller Failure		No
16	sysalarm_set		17	1	FID Flame out		No
17	sysalarm_set		18	1	Warmstart Calibration Failure		No

18	sysalarm_set	19	1	Valve Timing Failure	No
19	sysalarm_set	20	1	Excess Response Factor Deviation	No
20	sysalarm_set	21	1	M200 Invalid Non-Volatile Data	No
21	sysalarm_set	22	1	M200 Invalid A Module Data	No
22	sysalarm_set	23	1	M200 Invalid B Module Data	No
23	sysalarm_set	24	1	M200 Bad Options	No
24	sysalarm_set	25	1	M200 Stack Overflow	No
25	sysalarm_set	26	1	M200 Hardware Shutdown	No
26	sysalarm_set	27	1	M200 Synchronization Failure	No
27	sysalarm_set	28	1	Preamp Input 1 Out of Range - DET1	No
28	sysalarm_set	29	1	Preamp Input 2 Out of Range - DET1	No
29	sysalarm_set	30	1	Preamp Input 3 Out of Range - DET1	No
30	sysalarm_set	31	1	Preamp Input 4 Out of Range - DET1	No
31	sysalarm_set	32	1	Preamp Failure - DET1	No
32	sysalarm_set	33	1	Analog Output 1 HIGH	No
33	sysalarm_set	34	1	Analog Output 2 HIGH	No
34	sysalarm_set	35	1	Analog Output 3 HIGH	No
35	sysalarm_set	36	1	Analog Output 4 HIGH	No
36	sysalarm_set	37	1	Analog Output 5 HIGH	No
37	sysalarm_set	38	1	Analog Output 6 HIGH	No
38	sysalarm_set	39	1	Analog Output 7 HIGH	No
39	sysalarm_set	40	1	Analog Output 8 HIGH	No
40	sysalarm_set	41	1	Analog Output 9 HIGH	No
41	sysalarm_set	42	1	Analog Output 10 HIGH	No
42	sysalarm_set	43	1	Analog Output 11 HIGH	No
43	sysalarm_set	44	1	Analog Output 12 HIGH	No
44	sysalarm_set	45	1	Analog Output 13 HIGH	No
45	sysalarm_set	46	1	Analog Output 14 HIGH	No
46	sysalarm_set	47	1	Analog Output 15 HIGH	No
47	sysalarm_set	48	1	Analog Output 16 HIGH	No
48	sysalarm_set	49	1	Analog Output 1 LOW	No
49	sysalarm_set	50	1	Analog Output 2 LOW	No
50	sysalarm_set	51	1	Analog Output 3 LOW	No



51	sysalarm_set	52	1	Analog Output 4 LOW	No
52	sysalarm_set	53	1	Analog Output 5 LOW	No
53	sysalarm_set	54	1	Analog Output 6 LOW	No
54	sysalarm_set	55	1	Analog Output 7 LOW	No
55	sysalarm_set	56	1	Analog Output 8 LOW	No
56	sysalarm_set	57	1	Analog Output 9 LOW	No
57	sysalarm_set	58	1	Analog Output 10 LOW	No
58	sysalarm_set	59	1	Analog Output 11 LOW	No
59	sysalarm_set	60	1	Analog Output 12 LOW	No
60	sysalarm_set	61	1	Analog Output 13 LOW	No
61	sysalarm_set	62	1	Analog Output 14 LOW	No
62	sysalarm_set	63	1	Analog Output 15 LOW	No
63	sysalarm_set	64	1	Analog Output 16 LOW	No
64	sysalarm_set	65	1	Analyzer Failure	No
65	sysalarm_set	66	1	Power Failure	No
66	sysalarm_set	67	1	Fused Peak Overflow - Noisy Baseline	No
67	sysalarm_set	68	1	CPU Battery Low	No
68	sysalarm_set	69	1	GC Idle	No
69	sysalarm_set	70	1	Real-Time Clock Failure	No
70	sysalarm_set	71	1	Analog Input 1 HIGH	No
71	sysalarm_set	72	1	Analog Input 2 HIGH	No
72	sysalarm_set	73	1	Analog Input 3 HIGH	No
73	sysalarm_set	74	1	Analog Input 4 HIGH	No
74	sysalarm_set	75	1	Analog Input 1 LOW	No
75	sysalarm_set	76	1	Analog Input 2 LOW	No
76	sysalarm_set	77	1	Analog Input 3 LOW	No
77	sysalarm_set	78	1	Analog Input 4 LOW	No
78	sysalarm_set	79	1	Preamp Input 1 Out of Range - DET2	No
79	sysalarm_set	80	1	Preamp Input 2 Out of Range - DET2	No
80	sysalarm_set	81	1	Preamp Input 3 Out of Range - DET2	No
81	sysalarm_set	82	1	Preamp Input 4 Out of Range - DET2	No
82	sysalarm_set	83	1	Preamp Failure - DET2	No
83	sysalarm_set	84	1	NA	No

84	sysalarm_set		85	1	NA	No
85	lmtalarm_set		1	1		No
86	lmtalarm_set		2	1		No
87	lmtalarm_set		3	1		No
88	lmtalarm_set		4	1		No
89	lmtalarm_set		5	1		No
90	lmtalarm_set		6	1		No
91	lmtalarm_set		7	1		No
92	lmtalarm_set		8	1		No
93	lmtalarm_set		9	1		No
94	lmtalarm_set		10	1		No
95	lmtalarm_set		11	1		No
96	lmtalarm_set		12	1		No
97	lmtalarm_set		13	1		No
98	lmtalarm_set		14	1		No
99	lmtalarm_set		15	1		No
100	lmtalarm_set		16	1		No
101	lmtalarm_set		17	1		No
102	lmtalarm_set		18	1		No
103	lmtalarm_set		19	1		No
104	lmtalarm_set		20	1		No
105	stream_data	stream_togg	1	1	Stream 1	No
106	stream_data	stream_togg	2	1	Stream 2	No
107	stream_data	stream_togg	3	1	Stream 3	No
108	stream_data	stream_togg	4	1	Stream 4	No
109	stream_data	stream_togg	5	1	Stream 5	No
110	stream_data	stream_togg	6	1	Stream 6	No
111	stream_data	stream_togg	7	1	Stream 7	No
112	stream_data	stream_togg	8	1	Stream 8	No
113	doutcur		1	1		No
114	doutcur		2	1		No
115	doutcur		3	1		No
116	doutcur		4	1		No
117	doutcur		5	1		No

Numeric(Registers)

0	stream_data	avg_molwgt	1	1	Char	4	Stream 1		No
2	analysis	molpct	1	1	Char	4	C6+ 47/35/17	0 - 1	No
3	analysis	molpct	1	2	Integer		PROPANE	0 - 1	No
4	analysis	molpct	1	3	Integer		i-BUTANE	0 - 1	No
5	analysis	molpct	1	4	Integer		n-BUTANE	0 - 1	No
6	analysis	molpct	1	5	Float		NEOPENTANE		No
8	analysis	molpct	1	6	Float		i-PENTANE		No
10	analysis	molpct	1	7	Float		n-PENTANE		No
12	analysis	molpct	1	8	Float		NITROGEN		No
14	analysis	molpct	1	9	Float		METHANE		No
16	analysis	molpct	2	9	Float		METHANE		No
18	analysis	molpct	3	9	Float		METHANE		No
20	analysis	molpct	4	9	Float		METHANE		No
22	analysis	molpct	5	9	Float		METHANE		No
24	analysis	molpct	5	10	Float		CARBON DIOXIDE		No
26	analysis	molpct	5	11	Float		ETHANE		No
28	analysis	molpct	6	11	Float		ETHANE		No
30	analysis	molpct	7	11	Float		ETHANE		No
32	analysis	molpct	8	11	Float		ETHANE		No

SIM\_2251

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Modbus	Variable	Field	Indices		Override
Reg.	Name	Name	S	C	Keylock?

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Boolean(Coils)

16-Bit Integer

3001	sim_compno	1	1	No
3002	sim_compno	2	1	No
3003	sim_compno	3	1	No
3004	sim_compno	4	1	No
3005	sim_compno	5	1	No
3006	sim_compno	6	1	No
3007	sim_compno	7	1	No
3008	sim_compno	8	1	No
3009	sim_compno	9	1	No
3010	sim_compno	10	1	No
3011	sim_compno	11	1	No
3012	sim_compno	12	1	No
3013	sim_compno	13	1	No
3014	sim_compno	14	1	No
3015	sim_compno	15	1	No
3016	sim_compno	16	1	No
3017	sim_compno	1	1	No
3018	sim_compno	2	1	No
3019	sim_compno	3	1	No
3020	sim_compno	4	1	No
3021	sim_compno	5	1	No
3022	sim_compno	6	1	No
3023	sim_compno	7	1	No
3024	sim_compno	8	1	No
3025	sim_compno	9	1	No
3026	sim_compno	10	1	No
3027	sim_compno	11	1	No

3028	sim_compno	12	1	No
3029	sim_compno	13	1	No
3030	sim_compno	14	1	No
3031	sim_compno	15	1	No
3032	sim_compno	16	1	No
3033	sim_anlytime	1	1	No
3034	sim_stream	1	1	No
3035	sim_smask	1	1	No
3036	sim_month	1	1	No
3037	sim_day	1	1	No
3038	sim_year	1	1	No
3039	sim_hour	1	1	No
3040	sim_min	1	1	No
3041	sim_cycmonth	1	1	No
3042	sim_cycday	1	1	No
3043	sim_cycyear	1	1	No
3044	sim_cychour	1	1	No
3045	sim_cycmin	1	1	No
3046	sim_alarm	1	1	No
3047	sim_alarm	2	1	No
3048	sim_alarm	3	1	No
3049	sim_alarm	4	1	No
3050	sim_alarm	5	1	No
3051	sim_alarm	6	1	No
3052	sim_alarm	7	1	No
3053	sim_alarm	8	1	No
3054	sim_alarm	9	1	No
3055	sim_alarm	10	1	No
3056	sim_alarm	11	1	No
3057	sim_alarm	12	1	No
3058	sim_newdata	1	1	No
3059	sim_cal	1	1	No

### 32-Bit Integer

5001	sim_cyctime	1	1	No
5002	sim_calcycle	1	1	No

### Floating-Point

7001	sim_molpct	1	1	No
7002	sim_molpct	2	1	No
7003	sim_molpct	3	1	No
7004	sim_molpct	4	1	No
7005	sim_molpct	5	1	No
7006	sim_molpct	6	1	No
7007	sim_molpct	7	1	No
7008	sim_molpct	8	1	No
7009	sim_molpct	9	1	No
7010	sim_molpct	10	1	No
7011	sim_molpct	11	1	No
7012	sim_molpct	12	1	No
7013	sim_molpct	13	1	No
7014	sim_molpct	14	1	No
7015	sim_molpct	15	1	No
7016	sim_molpct	16	1	No
7017	sim_gpmwt	1	1	No
7018	sim_gpmwt	2	1	No
7019	sim_gpmwt	3	1	No
7020	sim_gpmwt	4	1	No
7021	sim_gpmwt	5	1	No
7022	sim_gpmwt	6	1	No
7023	sim_gpmwt	7	1	No
7024	sim_gpmwt	8	1	No
7025	sim_gpmwt	9	1	No
7026	sim_gpmwt	10	1	No
7027	sim_gpmwt	11	1	No
7028	sim_gpmwt	12	1	No
7029	sim_gpmwt	13	1	No

7030	sim_gpmwt		14	1		No
7031	sim_gpmwt		15	1		No
7032	sim_gpmwt		16	1		No
7033	sim_dbtu		1	1		No
7034	sim_sbtu		1	1		No
7035	sim_rden_gas		1	1		No
7036	sim_compress		1	1		No
7037	sim_wobbe		1	1		No
7038	sim_unnormal		1	1		No
7039	sim_totgpm		1	1		No
7040	calcval		1	1	label 1	No
7041	calcval		2	1	label 2	No
7042	calcval		3	1		No
7043	calcval		4	1		No
7044	calcval		5	1		No
7045	sim_dummy		1	1		No
7046	sim_dummy		1	1		No
7047	sim_dummy		1	1		No
7048	sim_dummy		1	1		No
7049	sim_dummy		1	1		No
7050	sim_dummy		1	1		No
7051	sim_dummy		1	1		No
7052	sim_dummy		1	1		No
7053	sim_dummy		1	1		No
7054	sim_abtu		1	1		No
7055	avgs	avg	1	1	Not Used	No
7056	avgs	avg	2	1	Not Used	No
7057	avgs	avg	3	1	Not Used	No
7058	avgs	avg	4	1	Not Used	No
7059	avgs	avg	5	1	Not Used	No
7060	avgs	avg	6	1	Not Used	No
7061	avgs	avg	7	1	Not Used	No
7062	avgs	avg	8	1	Not Used	No

7063	avgs	avg	9	1	Not Used	No
7064	avgs	avg	10	1	Not Used	No
7065	avgs	avg	11	1	Not Used	No
7066	avgs	avg	12	1	Not Used	No
7067	avgs	avg	13	1	Not Used	No
7068	avgs	avg	14	1	Not Used	No
7069	avgs	avg	15	1	Not Used	No
7070	avg_archive1	avg	1	1	Not Used	No
7071	avg_archive1	avg	2	1	Not Used	No
7072	avg_archive1	avg	3	1	Not Used	No
7073	avg_archive1	avg	4	1	Not Used	No
7074	avg_archive1	avg	5	1	Not Used	No
7075	avg_archive1	avg	6	1	Not Used	No
7076	avg_archive1	avg	7	1	Not Used	No
7077	avg_archive1	avg	8	1	Not Used	No
7078	avg_archive1	avg	9	1	Not Used	No
7079	avg_archive1	avg	10	1	Not Used	No
7080	avg_archive1	avg	11	1	Not Used	No
7081	avg_archive1	avg	12	1	Not Used	No
7082	avg_archive1	avg	13	1	Not Used	No
7083	avg_archive1	avg	14	1	Not Used	No
7084	avg_archive1	avg	15	1	Not Used	No
7085	aincur		1	1	AI 1	No
7086	aincur		2	1		No
7087	sim_cal_abtu		1	1		No
7088	sim_cal_dbtu		1	1		No
7089	sim_cal_sbtu		1	1		No
7090	sim_cal_wobb		1	1		No
7091	sim_cal_rden		1	1		No
7092	sim_cal_comp		1	1		No
7093	sim_cal_gpm		1	1		No
7094	sim_cal_unno		1	1		No
7095	sim_rf		1	1		No



7096	sim_rf		2	1		No
7097	sim_rf		3	1		No
7098	sim_rf		4	1		No
7099	sim_rf		5	1		No
7100	sim_rf		6	1		No
7101	sim_rf		7	1		No
7102	sim_rf		8	1		No
7103	sim_rf		9	1		No
7104	sim_rf		10	1		No
7105	sim_rf		11	1		No
7106	sim_rf		12	1		No
7107	sim_rf		13	1		No
7108	sim_rf		14	1		No
7109	sim_rf		15	1		No
7110	sim_rf		16	1		No
7111	sim_rf		1	1		No
7112	sim_rf		2	1		No
7113	sim_rf		3	1		No
7114	sim_rf		4	1		No
7115	sim_rf		5	1		No
7116	sim_rf		6	1		No
7117	sim_rf		7	1		No
7118	sim_rf		8	1		No
7119	sim_rf		9	1		No
7120	sim_rf		10	1		No
7121	sim_rf		11	1		No
7122	sim_rf		12	1		No
7123	sim_rf		13	1		No
7124	sim_rf		14	1		No
7125	sim_rf		15	1		No
7126	sim_rf		16	1		No
7127	avgs	avg	1	1	Not Used	No
7128	avgs	avg	2	1	Not Used	No

7129	avgs	avg	3	1	Not Used	No
7130	avgs	avg	4	1	Not Used	No
7131	avgs	avg	5	1	Not Used	No
7132	avgs	avg	6	1	Not Used	No
7133	avgs	avg	7	1	Not Used	No
7134	avgs	avg	8	1	Not Used	No
7135	avgs	avg	9	1	Not Used	No
7136	avgs	avg	10	1	Not Used	No
7137	avgs	avg	11	1	Not Used	No
7138	avgs	avg	12	1	Not Used	No
7139	avgs	avg	13	1	Not Used	No
7140	avgs	avg	14	1	Not Used	No
7141	avgs	avg	15	1	Not Used	No
7142	avgs	avg	16	1	Not Used	No
7143	avgs	avg	17	1	Not Used	No
7144	avgs	avg	18	1	Not Used	No
7145	avgs	avg	19	1	Not Used	No
7146	avgs	avg	20	1	Not Used	No
7147	avgs	avg	21	1	Not Used	No
7148	avgs	avg	22	1	Not Used	No
7149	avgs	avg	23	1	Not Used	No
7150	avgs	avg	24	1	Not Used	No
7151	avgs	avg	25	1	Not Used	No
7152	avgs	avg	26	1	Not Used	No
7153	avgs	avg	27	1	Not Used	No
7154	avgs	avg	28	1	Not Used	No
7155	avgs	avg	29	1	Not Used	No
7156	avgs	avg	30	1	Not Used	No
7157	avgs	avg	31	1	Not Used	No
7158	avgs	avg	32	1	Not Used	No
7159	avgs	avg	33	1	Not Used	No
7160	avgs	avg	34	1	Not Used	No
7161	avgs	avg	35	1	Not Used	No

7162	avgs	avg	36	1	Not Used	No
7163	avgs	maximum	1	1	Not Used	No
7164	avgs	maximum	2	1	Not Used	No
7165	avgs	maximum	3	1	Not Used	No
7166	avgs	maximum	4	1	Not Used	No
7167	avgs	maximum	5	1	Not Used	No
7168	avgs	maximum	6	1	Not Used	No
7169	avgs	maximum	7	1	Not Used	No
7170	avgs	maximum	8	1	Not Used	No
7171	avgs	maximum	9	1	Not Used	No
7172	avgs	maximum	10	1	Not Used	No
7173	avgs	maximum	11	1	Not Used	No
7174	avgs	maximum	12	1	Not Used	No
7175	avgs	maximum	13	1	Not Used	No
7176	avgs	maximum	14	1	Not Used	No
7177	avgs	maximum	15	1	Not Used	No
7178	avgs	maximum	16	1	Not Used	No
7179	avgs	maximum	17	1	Not Used	No
7180	avgs	maximum	18	1	Not Used	No
7181	avgs	maximum	19	1	Not Used	No
7182	avgs	maximum	20	1	Not Used	No
7183	avgs	maximum	21	1	Not Used	No
7184	avgs	maximum	22	1	Not Used	No
7185	avgs	maximum	23	1	Not Used	No
7186	avgs	maximum	24	1	Not Used	No
7187	avgs	maximum	25	1	Not Used	No
7188	avgs	maximum	26	1	Not Used	No
7189	avgs	maximum	27	1	Not Used	No
7190	avgs	maximum	28	1	Not Used	No
7191	avgs	maximum	29	1	Not Used	No
7192	avgs	maximum	30	1	Not Used	No
7193	avgs	maximum	31	1	Not Used	No
7194	avgs	maximum	32	1	Not Used	No

7195	avgs	maximum	33	1	Not Used	No
7196	avgs	maximum	34	1	Not Used	No
7197	avgs	maximum	35	1	Not Used	No
7198	avgs	maximum	36	1	Not Used	No
7199	avgs	minimum	1	1	Not Used	No
7200	avgs	minimum	2	1	Not Used	No
7201	avgs	minimum	3	1	Not Used	No
7202	avgs	minimum	4	1	Not Used	No
7203	avgs	minimum	5	1	Not Used	No
7204	avgs	minimum	6	1	Not Used	No
7205	avgs	minimum	7	1	Not Used	No
7206	avgs	minimum	8	1	Not Used	No
7207	avgs	minimum	9	1	Not Used	No
7208	avgs	minimum	10	1	Not Used	No
7209	avgs	minimum	11	1	Not Used	No
7210	avgs	minimum	12	1	Not Used	No
7211	avgs	minimum	13	1	Not Used	No
7212	avgs	minimum	14	1	Not Used	No
7213	avgs	minimum	15	1	Not Used	No
7214	avgs	minimum	16	1	Not Used	No
7215	avgs	minimum	17	1	Not Used	No
7216	avgs	minimum	18	1	Not Used	No
7217	avgs	minimum	19	1	Not Used	No
7218	avgs	minimum	20	1	Not Used	No
7219	avgs	minimum	21	1	Not Used	No
7220	avgs	minimum	22	1	Not Used	No
7221	avgs	minimum	23	1	Not Used	No
7222	avgs	minimum	24	1	Not Used	No
7223	avgs	minimum	25	1	Not Used	No
7224	avgs	minimum	26	1	Not Used	No
7225	avgs	minimum	27	1	Not Used	No
7226	avgs	minimum	28	1	Not Used	No
7227	avgs	minimum	29	1	Not Used	No

7228	avgs	minimum	30	1	Not Used	No
7229	avgs	minimum	31	1	Not Used	No
7230	avgs	minimum	32	1	Not Used	No
7231	avgs	minimum	33	1	Not Used	No
7232	avgs	minimum	34	1	Not Used	No
7233	avgs	minimum	35	1	Not Used	No
7234	avgs	minimum	36	1	Not Used	No
7235	avg_archive1	avg	1	1	Not Used	No
7236	avg_archive1	avg	2	1	Not Used	No
7237	avg_archive1	avg	3	1	Not Used	No
7238	avg_archive1	avg	4	1	Not Used	No
7239	avg_archive1	avg	5	1	Not Used	No
7240	avg_archive1	avg	6	1	Not Used	No
7241	avg_archive1	avg	7	1	Not Used	No
7242	avg_archive1	avg	8	1	Not Used	No
7243	avg_archive1	avg	9	1	Not Used	No
7244	avg_archive1	avg	10	1	Not Used	No
7245	avg_archive1	avg	11	1	Not Used	No
7246	avg_archive1	avg	12	1	Not Used	No
7247	avg_archive1	avg	13	1	Not Used	No
7248	avg_archive1	avg	14	1	Not Used	No
7249	avg_archive1	avg	15	1	Not Used	No
7250	avg_archive1	avg	16	1	Not Used	No
7251	avg_archive1	avg	17	1	Not Used	No
7252	avg_archive1	avg	18	1	Not Used	No
7253	avg_archive1	avg	19	1	Not Used	No
7254	avg_archive1	avg	20	1	Not Used	No
7255	avg_archive1	avg	21	1	Not Used	No
7256	avg_archive1	avg	22	1	Not Used	No
7257	avg_archive1	avg	23	1	Not Used	No
7258	avg_archive1	avg	24	1	Not Used	No
7259	avg_archive1	avg	25	1	Not Used	No
7260	avg_archive1	avg	26	1	Not Used	No

7261	avg_archive1	avg	27	1	Not Used	No
7262	avg_archive1	avg	28	1	Not Used	No
7263	avg_archive1	avg	29	1	Not Used	No
7264	avg_archive1	avg	30	1	Not Used	No
7265	avg_archive1	avg	31	1	Not Used	No
7266	avg_archive1	avg	32	1	Not Used	No
7267	avg_archive1	avg	33	1	Not Used	No
7268	avg_archive1	avg	34	1	Not Used	No
7269	avg_archive1	avg	35	1	Not Used	No
7270	avg_archive1	avg	36	1	Not Used	No
7271	avg_archive1	maximum	1	1	Not Used	No
7272	avg_archive1	maximum	2	1	Not Used	No
7273	avg_archive1	maximum	3	1	Not Used	No
7274	avg_archive1	maximum	4	1	Not Used	No
7275	avg_archive1	maximum	5	1	Not Used	No
7276	avg_archive1	maximum	6	1	Not Used	No
7277	avg_archive1	maximum	7	1	Not Used	No
7278	avg_archive1	maximum	8	1	Not Used	No
7279	avg_archive1	maximum	9	1	Not Used	No
7280	avg_archive1	maximum	10	1	Not Used	No
7281	avg_archive1	maximum	11	1	Not Used	No
7282	avg_archive1	maximum	12	1	Not Used	No
7283	avg_archive1	maximum	13	1	Not Used	No
7284	avg_archive1	maximum	14	1	Not Used	No
7285	avg_archive1	maximum	15	1	Not Used	No
7286	avg_archive1	maximum	16	1	Not Used	No
7287	avg_archive1	maximum	17	1	Not Used	No
7288	avg_archive1	maximum	18	1	Not Used	No
7289	avg_archive1	maximum	19	1	Not Used	No
7290	avg_archive1	maximum	20	1	Not Used	No
7291	avg_archive1	maximum	21	1	Not Used	No
7292	avg_archive1	maximum	22	1	Not Used	No
7293	avg_archive1	maximum	23	1	Not Used	No

7294	avg_archive1	maximum	24	1	Not Used	No
7295	avg_archive1	maximum	25	1	Not Used	No
7296	avg_archive1	maximum	26	1	Not Used	No
7297	avg_archive1	maximum	27	1	Not Used	No
7298	avg_archive1	maximum	28	1	Not Used	No
7299	avg_archive1	maximum	29	1	Not Used	No
7300	avg_archive1	maximum	30	1	Not Used	No
7301	avg_archive1	maximum	31	1	Not Used	No
7302	avg_archive1	maximum	32	1	Not Used	No
7303	avg_archive1	maximum	33	1	Not Used	No
7304	avg_archive1	maximum	34	1	Not Used	No
7305	avg_archive1	maximum	35	1	Not Used	No
7306	avg_archive1	maximum	36	1	Not Used	No
7307	avg_archive1	minimum	1	1	Not Used	No
7308	avg_archive1	minimum	2	1	Not Used	No
7309	avg_archive1	minimum	3	1	Not Used	No
7310	avg_archive1	minimum	4	1	Not Used	No
7311	avg_archive1	minimum	5	1	Not Used	No
7312	avg_archive1	minimum	6	1	Not Used	No
7313	avg_archive1	minimum	7	1	Not Used	No
7314	avg_archive1	minimum	8	1	Not Used	No
7315	avg_archive1	minimum	9	1	Not Used	No
7316	avg_archive1	minimum	10	1	Not Used	No
7317	avg_archive1	minimum	11	1	Not Used	No
7318	avg_archive1	minimum	12	1	Not Used	No
7319	avg_archive1	minimum	13	1	Not Used	No
7320	avg_archive1	minimum	14	1	Not Used	No
7321	avg_archive1	minimum	15	1	Not Used	No
7322	avg_archive1	minimum	16	1	Not Used	No
7323	avg_archive1	minimum	17	1	Not Used	No
7324	avg_archive1	minimum	18	1	Not Used	No
7325	avg_archive1	minimum	19	1	Not Used	No
7326	avg_archive1	minimum	20	1	Not Used	No

7327	avg_archive1	minimum	21	1	Not Used	No
7328	avg_archive1	minimum	22	1	Not Used	No
7329	avg_archive1	minimum	23	1	Not Used	No
7330	avg_archive1	minimum	24	1	Not Used	No
7331	avg_archive1	minimum	25	1	Not Used	No
7332	avg_archive1	minimum	26	1	Not Used	No
7333	avg_archive1	minimum	27	1	Not Used	No
7334	avg_archive1	minimum	28	1	Not Used	No
7335	avg_archive1	minimum	29	1	Not Used	No
7336	avg_archive1	minimum	30	1	Not Used	No
7337	avg_archive1	minimum	31	1	Not Used	No
7338	avg_archive1	minimum	32	1	Not Used	No
7339	avg_archive1	minimum	33	1	Not Used	No
7340	avg_archive1	minimum	34	1	Not Used	No
7341	avg_archive1	minimum	35	1	Not Used	No
7342	avg_archive1	minimum	36	1	Not Used	No
7343	avg_archive1	avg	1	2	Not Used	No
7344	avg_archive1	avg	2	2	Not Used	No
7345	avg_archive1	avg	3	2	Not Used	No
7346	avg_archive1	avg	4	2	Not Used	No
7347	avg_archive1	avg	5	2	Not Used	No
7348	avg_archive1	avg	6	2	Not Used	No
7349	avg_archive1	avg	7	2	Not Used	No
7350	avg_archive1	avg	8	2	Not Used	No
7351	avg_archive1	avg	9	2	Not Used	No
7352	avg_archive1	avg	10	2	Not Used	No
7353	avg_archive1	avg	11	2	Not Used	No
7354	avg_archive1	avg	12	2	Not Used	No
7355	avg_archive1	avg	13	2	Not Used	No
7356	avg_archive1	avg	14	2	Not Used	No
7357	avg_archive1	avg	15	2	Not Used	No
7358	avg_archive1	avg	16	2	Not Used	No
7359	avg_archive1	avg	17	2	Not Used	No



7360	avg_archive1	avg	18	2	Not Used	No
7361	avg_archive1	avg	19	2	Not Used	No
7362	avg_archive1	avg	20	2	Not Used	No
7363	avg_archive1	avg	21	2	Not Used	No
7364	avg_archive1	avg	22	2	Not Used	No
7365	avg_archive1	avg	23	2	Not Used	No
7366	avg_archive1	avg	24	2	Not Used	No
7367	avg_archive1	avg	25	2	Not Used	No
7368	avg_archive1	avg	26	2	Not Used	No
7369	avg_archive1	avg	27	2	Not Used	No
7370	avg_archive1	avg	28	2	Not Used	No
7371	avg_archive1	avg	29	2	Not Used	No
7372	avg_archive1	avg	30	2	Not Used	No
7373	avg_archive1	avg	31	2	Not Used	No
7374	avg_archive1	avg	32	2	Not Used	No
7375	avg_archive1	avg	33	2	Not Used	No
7376	avg_archive1	avg	34	2	Not Used	No
7377	avg_archive1	avg	35	2	Not Used	No
7378	avg_archive1	avg	36	2	Not Used	No
7379	avg_archive1	maximum	1	2	Not Used	No
7380	avg_archive1	maximum	2	2	Not Used	No
7381	avg_archive1	maximum	3	2	Not Used	No
7382	avg_archive1	maximum	4	2	Not Used	No
7383	avg_archive1	maximum	5	2	Not Used	No
7384	avg_archive1	maximum	6	2	Not Used	No
7385	avg_archive1	maximum	7	2	Not Used	No
7386	avg_archive1	maximum	8	2	Not Used	No
7387	avg_archive1	maximum	9	2	Not Used	No
7388	avg_archive1	maximum	10	2	Not Used	No
7389	avg_archive1	maximum	11	2	Not Used	No
7390	avg_archive1	maximum	12	2	Not Used	No
7391	avg_archive1	maximum	13	2	Not Used	No
7392	avg_archive1	maximum	14	2	Not Used	No

7393	avg_archive1	maximum	15	2	Not Used	No
7394	avg_archive1	maximum	16	2	Not Used	No
7395	avg_archive1	maximum	17	2	Not Used	No
7396	avg_archive1	maximum	18	2	Not Used	No
7397	avg_archive1	maximum	19	2	Not Used	No
7398	avg_archive1	maximum	20	2	Not Used	No
7399	avg_archive1	maximum	21	2	Not Used	No
7400	avg_archive1	maximum	22	2	Not Used	No
7401	avg_archive1	maximum	23	2	Not Used	No
7402	avg_archive1	maximum	24	2	Not Used	No
7403	avg_archive1	maximum	25	2	Not Used	No
7404	avg_archive1	maximum	26	2	Not Used	No
7405	avg_archive1	maximum	27	2	Not Used	No
7406	avg_archive1	maximum	28	2	Not Used	No
7407	avg_archive1	maximum	29	2	Not Used	No
7408	avg_archive1	maximum	30	2	Not Used	No
7409	avg_archive1	maximum	31	2	Not Used	No
7410	avg_archive1	maximum	32	2	Not Used	No
7411	avg_archive1	maximum	33	2	Not Used	No
7412	avg_archive1	maximum	34	2	Not Used	No
7413	avg_archive1	maximum	35	2	Not Used	No
7414	avg_archive1	maximum	36	2	Not Used	No
7415	avg_archive1	minimum	1	2	Not Used	No
7416	avg_archive1	minimum	2	2	Not Used	No
7417	avg_archive1	minimum	3	2	Not Used	No
7418	avg_archive1	minimum	4	2	Not Used	No
7419	avg_archive1	minimum	5	2	Not Used	No
7420	avg_archive1	minimum	6	2	Not Used	No
7421	avg_archive1	minimum	7	2	Not Used	No
7422	avg_archive1	minimum	8	2	Not Used	No
7423	avg_archive1	minimum	9	2	Not Used	No
7424	avg_archive1	minimum	10	2	Not Used	No
7425	avg_archive1	minimum	11	2	Not Used	No

7426	avg_archive1	minimum	12	2	Not Used	No
7427	avg_archive1	minimum	13	2	Not Used	No
7428	avg_archive1	minimum	14	2	Not Used	No
7429	avg_archive1	minimum	15	2	Not Used	No
7430	avg_archive1	minimum	16	2	Not Used	No
7431	avg_archive1	minimum	17	2	Not Used	No
7432	avg_archive1	minimum	18	2	Not Used	No
7433	avg_archive1	minimum	19	2	Not Used	No
7434	avg_archive1	minimum	20	2	Not Used	No
7435	avg_archive1	minimum	21	2	Not Used	No
7436	avg_archive1	minimum	22	2	Not Used	No
7437	avg_archive1	minimum	23	2	Not Used	No
7438	avg_archive1	minimum	24	2	Not Used	No
7439	avg_archive1	minimum	25	2	Not Used	No
7440	avg_archive1	minimum	26	2	Not Used	No
7441	avg_archive1	minimum	27	2	Not Used	No
7442	avg_archive1	minimum	28	2	Not Used	No
7443	avg_archive1	minimum	29	2	Not Used	No
7444	avg_archive1	minimum	30	2	Not Used	No
7445	avg_archive1	minimum	31	2	Not Used	No
7446	avg_archive1	minimum	32	2	Not Used	No
7447	avg_archive1	minimum	33	2	Not Used	No
7448	avg_archive1	minimum	34	2	Not Used	No
7449	avg_archive1	minimum	35	2	Not Used	No
7450	avg_archive1	minimum	36	2	Not Used	No
7451	avg_archive1	avg	1	3	Not Used	No
7452	avg_archive1	avg	2	3	Not Used	No
7453	avg_archive1	avg	3	3	Not Used	No
7454	avg_archive1	avg	4	3	Not Used	No
7455	avg_archive1	avg	5	3	Not Used	No
7456	avg_archive1	avg	6	3	Not Used	No
7457	avg_archive1	avg	7	3	Not Used	No
7458	avg_archive1	avg	8	3	Not Used	No

7459	avg_archive1	avg	9	3	Not Used	No
7460	avg_archive1	avg	10	3	Not Used	No
7461	avg_archive1	avg	11	3	Not Used	No
7462	avg_archive1	avg	12	3	Not Used	No
7463	avg_archive1	avg	13	3	Not Used	No
7464	avg_archive1	avg	14	3	Not Used	No
7465	avg_archive1	avg	15	3	Not Used	No
7466	avg_archive1	avg	16	3	Not Used	No
7467	avg_archive1	avg	17	3	Not Used	No
7468	avg_archive1	avg	18	3	Not Used	No
7469	avg_archive1	avg	19	3	Not Used	No
7470	avg_archive1	avg	20	3	Not Used	No
7471	avg_archive1	avg	21	3	Not Used	No
7472	avg_archive1	avg	22	3	Not Used	No
7473	avg_archive1	avg	23	3	Not Used	No
7474	avg_archive1	avg	24	3	Not Used	No
7475	avg_archive1	avg	25	3	Not Used	No
7476	avg_archive1	avg	26	3	Not Used	No
7477	avg_archive1	avg	27	3	Not Used	No
7478	avg_archive1	avg	28	3	Not Used	No
7479	avg_archive1	avg	29	3	Not Used	No
7480	avg_archive1	avg	30	3	Not Used	No
7481	avg_archive1	avg	31	3	Not Used	No
7482	avg_archive1	avg	32	3	Not Used	No
7483	avg_archive1	avg	33	3	Not Used	No
7484	avg_archive1	avg	34	3	Not Used	No
7485	avg_archive1	avg	35	3	Not Used	No
7486	avg_archive1	avg	36	3	Not Used	No
7487	avg_archive1	maximum	1	3	Not Used	No
7488	avg_archive1	maximum	2	3	Not Used	No
7489	avg_archive1	maximum	3	3	Not Used	No
7490	avg_archive1	maximum	4	3	Not Used	No
7491	avg_archive1	maximum	5	3	Not Used	No

7492	avg_archive1	maximum	6	3	Not Used	No
7493	avg_archive1	maximum	7	3	Not Used	No
7494	avg_archive1	maximum	8	3	Not Used	No
7495	avg_archive1	maximum	9	3	Not Used	No
7496	avg_archive1	maximum	10	3	Not Used	No
7497	avg_archive1	maximum	11	3	Not Used	No
7498	avg_archive1	maximum	12	3	Not Used	No
7499	avg_archive1	maximum	13	3	Not Used	No
7500	avg_archive1	maximum	14	3	Not Used	No
7501	avg_archive1	maximum	15	3	Not Used	No
7502	avg_archive1	maximum	16	3	Not Used	No
7503	avg_archive1	maximum	17	3	Not Used	No
7504	avg_archive1	maximum	18	3	Not Used	No
7505	avg_archive1	maximum	19	3	Not Used	No
7506	avg_archive1	maximum	20	3	Not Used	No
7507	avg_archive1	maximum	21	3	Not Used	No
7508	avg_archive1	maximum	22	3	Not Used	No
7509	avg_archive1	maximum	23	3	Not Used	No
7510	avg_archive1	maximum	24	3	Not Used	No
7511	avg_archive1	maximum	25	3	Not Used	No
7512	avg_archive1	maximum	26	3	Not Used	No
7513	avg_archive1	maximum	27	3	Not Used	No
7514	avg_archive1	maximum	28	3	Not Used	No
7515	avg_archive1	maximum	29	3	Not Used	No
7516	avg_archive1	maximum	30	3	Not Used	No
7517	avg_archive1	maximum	31	3	Not Used	No
7518	avg_archive1	maximum	32	3	Not Used	No
7519	avg_archive1	maximum	33	3	Not Used	No
7520	avg_archive1	maximum	34	3	Not Used	No
7521	avg_archive1	maximum	35	3	Not Used	No
7522	avg_archive1	maximum	36	3	Not Used	No
7523	avg_archive1	minimum	1	3	Not Used	No
7524	avg_archive1	minimum	2	3	Not Used	No

7525	avg_archive1	minimum	3	3	Not Used	No
7526	avg_archive1	minimum	4	3	Not Used	No
7527	avg_archive1	minimum	5	3	Not Used	No
7528	avg_archive1	minimum	6	3	Not Used	No
7529	avg_archive1	minimum	7	3	Not Used	No
7530	avg_archive1	minimum	8	3	Not Used	No
7531	avg_archive1	minimum	9	3	Not Used	No
7532	avg_archive1	minimum	10	3	Not Used	No
7533	avg_archive1	minimum	11	3	Not Used	No
7534	avg_archive1	minimum	12	3	Not Used	No
7535	avg_archive1	minimum	13	3	Not Used	No
7536	avg_archive1	minimum	14	3	Not Used	No
7537	avg_archive1	minimum	15	3	Not Used	No
7538	avg_archive1	minimum	16	3	Not Used	No
7539	avg_archive1	minimum	17	3	Not Used	No
7540	avg_archive1	minimum	18	3	Not Used	No
7541	avg_archive1	minimum	19	3	Not Used	No
7542	avg_archive1	minimum	20	3	Not Used	No
7543	avg_archive1	minimum	21	3	Not Used	No
7544	avg_archive1	minimum	22	3	Not Used	No
7545	avg_archive1	minimum	23	3	Not Used	No
7546	avg_archive1	minimum	24	3	Not Used	No
7547	avg_archive1	minimum	25	3	Not Used	No
7548	avg_archive1	minimum	26	3	Not Used	No
7549	avg_archive1	minimum	27	3	Not Used	No
7550	avg_archive1	minimum	28	3	Not Used	No
7551	avg_archive1	minimum	29	3	Not Used	No
7552	avg_archive1	minimum	30	3	Not Used	No
7553	avg_archive1	minimum	31	3	Not Used	No
7554	avg_archive1	minimum	32	3	Not Used	No
7555	avg_archive1	minimum	33	3	Not Used	No
7556	avg_archive1	minimum	34	3	Not Used	No
7557	avg_archive1	minimum	35	3	Not Used	No

MON2000

7558 avg\_archive1 minimum 36 3 Not Used

No

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\*\*\*\*\*\*\*\*\*\*  
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TCP/IP Report from Model 2350A

4/28/2005 2:00:51 PM

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Usage	PC
Comm ID	0
Host Name	DANIELGC
Use DHCP/Specify an IP address	Specify an IP Address
IP Address	172.16.23.128
Subnet Mask	255.255.240.0
Gateway	172.16.16.2
Read/Write	RW

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Temperature Control Report from Model 2350A

4/28/2005 2:00:52 PM

Loop	1	2	3	4
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Mode	Automatic	Automatic	Automatic	Automatic
Prop Gain	60	60	60	60
Reset	600	600	600	600
Rate	1	1	1	1
D Filter	5	5	5	5
Setpoint	82	84	40	350

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End of Report

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## APPENDIX B: COMPONENT DATA TABLE

This appendix provides a sample standard component data table as well as a table of the ISO-related components.

- [Table B-1, Example Standard Component Data Table](#)
- [Table B-2, ISO Component Data Table](#)

All values depend on a base pressure of 14.73 PSIA and a base temperature of 60 °F (15.56 °C).

BTU components that are listed in [Table B-1](#) reference *GPA Standard 2145-09*. The ISO component data table references *ISO Standard 6976: 1995(E)*.



**NOTE:** An asterisk (\*) denotes components that are assigned temporary I.D. codes, starting with 150, as they are used.

Table B-1 Example Standard Component Data Table

Component Name	Mol Wt	Reid Vapor	Rel Dens Gas	Rel Dens Liquid	Lb/Gal	GPM Factor	Gross Dry BTU	Net Dry BTU	AGA 8 Component	Daniel Sim 2251 I.D. No.
Acetylene	26.04	0	0.899	0.615	0	0	1476.9	1426.5	Ethane	22
Air	28.9625	0	1	0.87586	7.3022	0.104759	0	0	Airmix1	26
Argon	39.95	0	1.3792	0	0	0	0	0	Argon	46
Ammonia	17.03	212	0.588	0.6173	5.15	0.0874	435.4	359.8	None	*
Benzene	78.11	3.224	2.6969	0.8844	7.373	0.2798	3750.5	3599.2	n-Hexane	*
Butanes	58.1222	62.1055	2.0068	0.573515	4.78155	0.32117	3264.64	3012.45	n-Butane	33
Butene-1	56.11	63.05	1.9372	0.6013	5.013	0.2956	3087	2885.4	n-Butane	28
Butenes	56.11	55.448	1.9372	0.6097	5.0833	0.2916	3077.4	2875.73	n-Butane	32
1,2-Butadiene	54.09	20	1.8676	0.658	5.486	0.2604	2946.7	2795.5	n-Butane	35
1,3-Butadiene	54.09	60	1.8676	0.6272	5.229	0.2732	2886.6	2735.3	n-Butane	34
C3+	44.0956	188.62	1.5225	0.50719	4.2285	0.275429	2521.92	2320.36	Propane	47
C4+	58.1222	51.567	2.0068	0.5842	4.8706	0.315183	3269.85	3017.97	n-Butane	48
C4=1	56.11	63.05	1.9372	0.6013	5.013	0.2956	3087	2885.4	n-Butane	29
C5+	72.1488	15.576	2.4911	0.63071	5.2584	0.362396	4017.97	3715.58	n-Pentane	49
C6+ 47/35/17	95.9558	3.01891	3.31309	0.679907	5.66853	0.446214	5288.71	4900.62	C6mix1	08
C6+ 50/50/00	93.1887	3.29	3.21755	0.676145	5.63715	0.43619	5141.12	4762.99	C6mix2	09
C6+ Gpa 2261-99	93.1887	3.51579	3.21755	0.67556	5.63228	0.436267	5141.09	4762.99	C6mix3	10

Table B-1 Example Standard Component Data Table (Continued)

Component Name	Mol Wt	Reid Vapor	Rel Dens Gas	Rel Dens Liquid	Lb/Gal	GPM Factor	Gross Dry BTU	Net Dry BTU	AGA 8 Component	Daniel Sim 2251 I.D. No.
C6+ 57/28/14	94.1904	3.37386	3.25214	0.677036	5.64458	0.439881	5194.53	4812.82	C6mix4	11
Carbon Monoxide	28.01	0	0.9671	0.801	6.68	0	321.2	321.2	CO	15
Carbon Dioxide	44.0095	0	1.5195	0.81716	6.8129	0.170618	0	0	CO2	17
Cis-2-Butene	56.11	45.54	1.9372	0.6271	5.228	0.2835	3079.3	2877.6	n-Butane	31
COS	60.08	0	0	0	0	0	0	0	None	42
CS2	76.14	0	2.6298	0	0	0	1267	1267	None	41
Cyclohexane	84.16	3.264	2.9057	0.7834	6.531	0.3403	4492.1	4189.4	n-Hexane	*
Cyclopentane	70.14	9.914	2.4215	0.7504	6.256	0.2961	3772.4	3520.2	n-Pentane	*
Diisobutyl	114.23	1.101	3.9439	0.6979	5.819	0.5185	6247.9	5793.9	n-Octane	*
2,3-Dimethbutan	86.18	7.404	2.9753	0.6664	5.556	0.4096	4756	4403.1	n-Hexane	*
2,2-Dimethpenta	100.21	3.492	3.4596	0.6782	5.654	0.4682	5494.6	5091.4	n-Heptane	*
2,4-Dimethpenta	100.21	3.292	3.4596	0.6773	5.647	0.4686	5499.4	5096	n-Heptane	*
3,3-Dimethpenta	100.2	2.773	3.4596	0.6976	5.816	0.455	5501.5	5098.2	n-Heptane	*
Ethane	30.069	800	1.0382	0.35628	2.9704	0.267369	1773.79	1622.75	Ethane	01
Ethyl Alcohol	46.07	2.3	1.5906	0.794	6.62	0.1839	1602.8	1451.5	None	*
Ethylbenzene	106.17	0.371	3.6655	0.8718	7.268	0.3858	5234.3	4982	n-Octane	*
Ethylene	28.0532	0	0.9686	0	0	0	1603.4	1502.47	Ethane	21
Ethylene Oxide	44.05	0	1.49	0	0	0	1459.4	1410.2	None	36
3-Ethylpentane	100.21	2.012	3.4596	0.7028	5.859	0.4517	5513.4	5110.1	n-Heptane	*

Table B-1 Example Standard Component Data Table (Continued)

Component Name	Mol Wt	Reid Vapor	Rel Dens Gas	Rel Dens Liquid	Lb/Gal	GPM Factor	Gross Dry BTU	Net Dry BTU	AGA 8 Component	Daniel Sim 2251 I.D. No.
H2S	34.0809	395	1.1767	0.79886	6.6602	0.135156	638.57	588.15	H2S	40
HCL	36.46	925	1.2588	0.8558	7.135	0.1349	0	0	None	*
Helium	4.0026	0	0.1382	0.12486	1.041	0.101559	0	0	Helium	13
Hydrogen	2.02	0	0.0696	0.07	0	0	325	274.4	Hydrogen	12
i-Butane	58.1222	72.644	2.0068	0.56283	4.6925	0.327158	3259.42	3006.94	i-Butane	03
i-Butene	56.11	63.4	1.9372	0.6004	5.006	0.296	3068.2	2866.5	n-Butane	27
i-Pentane	72.1488	20.474	2.4911	0.62514	5.212	0.365621	4010.16	3707.56	i-Pentane	05
i-Propylbenzene	120.19	0.188	4.1498	0.8663	7.223	0.4396	5976.6	5674	n-Nonane	*
i-Octane	114.23	1.708	3.9439	0.6962	5.804	0.5199	6246.1	5792.2	n-Octane	*
Methane	16.0425	5000	0.5539	0.3	2.5	0.169487	1012.34	911.5	Methane	00
Methyl Alcohol	32.04	4.63	1.1063	0.796	6.64	0.1275	868.7	767.9	None	*
Methylcyclo C5	84.16	4.503	2.9057	0.7536	6.283	0.3538	4511.6	4209.1	n-Hexane	*
Methylcyclo C6	98.19	1.609	3.39	0.774	6.453	0.4019	5228	4874.9	n-Heptane	*
2-Methylhexane	100.21	2.271	3.4596	0.683	5.694	0.4647	5507.3	5104	n-Heptane	*
3-Methylhexane	100.21	2.13	3.4596	0.6917	5.767	0.4589	5511.3	5107.8	n-Heptane	*
m-Xylene	106.17	0.326	3.6655	0.8687	7.243	0.3871	5219.9	4967.8	n-Octane	*
n-Butane	58.1222	51.567	2.0068	0.5842	4.8706	0.315183	3269.85	3017.97	n-Butane	04
n-Decane	142.2817	0.06148	4.9126	0.73458	6.1244	0.613636	7760.81	7206.63	n-Decane	*
n-Heptane	100.2019	1.619	3.4597	0.68823	5.7379	0.461258	5515.33	5111.8	n-Heptane	45

Table B-1 Example Standard Component Data Table (Continued)

Component Name	Mol Wt	Reid Vapor	Rel Dens Gas	Rel Dens Liquid	Lb/Gal	GPM Factor	Gross Dry BTU	Net Dry BTU	AGA 8 Component	Daniel Sim 2251 I.D. No.
n-Hexane	86.1754	4.961	2.9754	0.66406	5.5364	0.411121	4766.9	4414.19	n-Hexane	39
n-Nonane	128.2551	0.1809	4.4283	0.72224	6.0215	0.562592	7012.49	6508.02	n-Nonane	38
n-Octane	114.2285	0.5349	3.944	0.70655	5.8907	0.512168	6263.46	5809.41	n-Octane	20
n-Pentane	72.1488	15.576	2.4911	0.63071	5.2584	0.362396	4017.97	3715.58	n-Pentane	06
Neohexane	86.18	9.856	2.9753	0.654	5.453	0.4175	4747.2	4394.1	n-Hexane	*
Neopentane	72.15	35.9	2.4911	0.5967	4.975	0.383	3993.9	3691.4	i-Pentane	07
Nitrogen	28.0134	0	0.9672	0.80687	6.7271	0.10999	0	0	Nitrogen	14
NO2	46	0	0	0	0	0	0	0	None	19
NO	30.01	0	0	0	0	0	0	0	None	*
N2O	44.02	0	0	0	0	0	0	0	None	18
o-Xylene	106.2	0.264	3.6655	0.8848	7.377	0.3801	5222	4969.7	n-Octane	*
Oxygen	31.9988	0	1.1048	1.1423	9.5238	0.088739	0	0	Oxygen	16
1-Pentene	70.14	19.115	2.4215	0.6457	5.383	0.3441	3835.4	3583.3	n-Pentane	37
Propane	44.0956	188.62	1.5225	0.50719	4.2285	0.275429	2521.92	2320.36	Propane	02
Propadiene	40.07	0	1.411	0	0	0	2254.2	2254.2	Propane	24
Propylene	42.0797	227.3	1.4529	0.5226	4.3571	0.255087	2338.4	2187.05	Propane	23
Propyne	40.07	0	1.411	0	0	0	2246.2	2246.2	Propane	25
p-Xylene	106.17	0.342	3.6655	0.8657	7.218	0.3885	5220.8	4968.6	n-Octane	*
Sulfur Dioxide	64.06	88	2.2117	1.397	11.65	0.1453	0	0	CO2	43

Table B-1 Example Standard Component Data Table (Continued)

Component Name	Mol Wt	Reid Vapor	Rel Dens Gas	Rel Dens Liquid	Lb/Gal	GPM Factor	Gross Dry BTU	Net Dry BTU	AGA 8 Component	Daniel Sim 2251 I.D. No.
Styrene	104.15	0.24	3.5959	0.911	7.595	0.3622	5042.7	4841	n-Octane	*
Toluene	92.14	1.032	3.1812	0.8718	7.268	0.3348	4485.4	4283.5	n-Heptane	*
Trans-2-Butene	56.11	49.8	1.9372	0.61	5.086	0.2914	3075.1	2873.4	n-Butane	30
Triptane	100.21	3.374	3.4596	0.6946	5.791	0.4571	5496.2	5093	n-Heptane	*
Water	18.0153	0.9505	0.62202	1	8.3372	0.057072	50.43	0	Water	44

Table B-2 ISO Component Data Table

Component Name	Molar Mass	Sum Factor (0°C)	Sum Factor (15°C)	Sum Factor (20°C)	CVSup kJ/Mol (0°C)	CVSup kJ/Mol (15°C)	CVSup kJ/Mol (20°C)	CV Sup kJ/Mol (25°C)	CV Inf kJ/Mol (0°C)	CV Inf kJ/Mol (15°C)	CV Inf kJ/Mol (20°C)	CV Inf kJ/Mol (25°C)
Acetylene	26.038	0.0949	0.0837	0.0837	1301.86	1301.37	1301.21	1301.05	1256.79	1256.94	1256.98	1257.03
Air	28.9625	0	0	0	0	0	0	0	0	0	0	0
Argon	39.948	0.0316	0.0283	0.0265	0	0	0	0	0	0	0	0
Ammonia	17.0306	0.1225	0.1095	0.1049	384.57	383.51	383.16	382.81	316.96	316.86	316.82	316.79
Benzene	78.114	0.3017	0.272	0.253	3305.03	3302.86	3302.15	3301.43	3169.81	3169.56	3169.48	3169.38
Butanes	58.1222	0.2059	0.183	0.1743	2879.01	2875.17	2873.98	2872.8	2653.64	2653.01	2652.86	2652.72
Butene-1	56.108	0.1871	0.1732	0.1673	2721.55	2718.7	2717.75	2716.82	2541.25	2540.97	2540.86	2540.76
Butenes	56.108	0.1923	0.176	0.1717	2713.09	2710.23	2709.31	2708.36	2532.79	2532.49	2532.42	2532.27
1,2-Butadiene	54.092	0.2121	0.1924	0.1871	2597.13	2595.12	2594.45	2593.79	2461.91	2461.82	2461.78	2461.74
1,3-Butadiene	54.092	0.1844	0.1703	0.1643	2544.13	2542.1	2541.43	2540.77	2408.91	2408.8	2408.76	2408.72
C3+	44.0956	0.1682	0.1534	0.147	2461.51	2458.25	2457.23	2456.16	2264.71	2264.52	2264.38	2264.25
C4+	58.1222	0.2281	0.2049	0.1947	3081.63	3077.47	3076.32	3074.97	2841.63	2841.98	2841.83	2841.68
C4=1	56.108	0.1871	0.1732	0.1673	2721.55	2718.7	2717.75	2716.82	2541.25	2540.97	2540.86	2540.76
C5+	72.1488	0.2999	0.2651	0.2505	3754.2	3749.68	3748.71	3746.71	3464.63	3468.87	3468.75	3468.52
C6+ 47/35/17	95.9558	0.389	0.3459	0.3331	4663.16	4657.69	4655.86	4654.08	4316.22	4315.67	4315.46	4315.27
C6+ 50/50/00	93.1887	0.3704	0.3305	0.3183	4533.05	4527.71	4525.93	4524.19	4194.99	4194.46	4194.25	4194.07
C6+ GPA 2261-99	93.1887	0.3943	0.3503	0.3373	4697.93	4692.42	4690.58	4688.78	4348.61	4348.06	4347.84	4347.66

Table B-2 ISO Component Data Table

Component Name	Molar Mass	Sum Factor (0°C)	Sum Factor (15°C)	Sum Factor (20°C)	CVSup kJ/Mol (0°C)	CVSup kJ/Mol (15°C)	CVSup kJ/Mol (20°C)	CV Sup kJ/Mol (25°C)	CV Inf kJ/Mol (0°C)	CV Inf kJ/Mol (15°C)	CVInf kJ/Mol (20°C)	CV Inf kJ/Mol (25°C)
C6+ 57/28/14	94.1904	0.3781	0.3367	0.3243	4580.15	4574.76	4572.96	4571.2	4238.87	4238.34	4238.12	4237.94
Carbon Monoxide	28.01	0.0265	0.0224	0.02	282.8	282.91	282.95	282.98	282.8	282.91	282.95	282.98
Carbon Dioxide	44.0095	0.0819	0.0748	0.0728	0	0	0	0	0	0	0	0
Cis-2-Butene	56.108	0.1975	0.1817	0.1761	2714.9	2711.9	2711	2710	2534.6	2534.2	2534.1	2533.9
COS	60.076	0.1225	0.114	0.1095	548.01	548.15	548.19	548.23	548.01	548.15	548.19	548.23
CS2	76.143	0.2145	0.1949	0.1871	1104.06	1104.32	1104.41	1104.49	1104.06	1104.32	1104.41	1104.49
Cyclohexane	84.161	0.3209	0.2864	0.2757	3960.67	3956.02	3954.47	3952.96	3690.23	3689.42	3689.13	3688.86
Cyclopentane	70.14	0.255	0.2302	0.2236	3326.14	3322.19	3320.88	3319.59	3100.77	3100.03	3099.76	3099.51
Diisobutyl	114.23	0	0	0	0	0	0	0	0	0	0	0
2,3-Dimethbutan	86.177	0.3	0.2739	0.2569	4193.63	4188.6	4186.93	4185.28	3878.11	3877.57	3877.36	3877.17
2,2-Dimethpenta	100.21	0	0	0	0	0	0	0	0	0	0	0
2,4-Dimethpenta	100.21	0	0	0	0	0	0	0	0	0	0	0
3,3-Dimethpenta	100.2	0	0	0	0	0	0	0	0	0	0	0
Ethane	30.069	0.1	0.0922	0.0894	1564.34	1562.14	1561.41	1560.69	1429.12	1428.84	1428.74	1428.64
Ethyl Alcohol	46.07	0	0	0	0	0	0	0	0	0	0	0
Ethylbenzene	106.167	0.4858	0.4207	0.4037	4613.14	4609.53	4608.32	4607.15	4387.77	4387.37	4387.2	4387.07
Ethylene	28.0532	0.0866	0.08	0.0775	1413.51	1412.11	1411.65	1411.18	1323.36	1323.24	1323.2	1323.15
Ethylene Oxide	44.05	0	0	0	0	0	0	0	0	0	0	0



Table B-2 ISO Component Data Table

Component Name	Molar Mass	Sum Factor (0°C)	Sum Factor (15°C)	Sum Factor (20°C)	CVSup kJ/Mol (0°C)	CVSup kJ/Mol (15°C)	CVSup kJ/Mol (20°C)	CV Sup kJ/Mol (25°C)	CV Inf kJ/Mol (0°C)	CV Inf kJ/Mol (15°C)	CVInf kJ/Mol (20°C)	CV Inf kJ/Mol (25°C)
3-Ethylpentane	100.21	0	0	0	0	0	0	0	0	0	0	0
H2S	34.0809	0.1	0.1	0.1	562.94	562.38	562.19	562.01	517.87	517.95	517.97	517.99
HCL	36.46	925	1.2588	0.8558	7.135	0.1349	0	0	0	0	0	0
Helium	4.0026	0.0006	0.0002	0	0	0	0	0	0	0	0	0
Hydrogen	2.0159	-0.004	-0.0048	-0.0051	286.63	286.15	285.99	285.83	241.56	241.72	241.76	241.81
i-Butane	58.1222	0.2049	0.1789	0.1703	2874.2	2870.58	2869.38	2868.2	2648.83	2648.42	2648.26	2648.12
i-Butene	56.108	0.1871	0.1703	0.1673	2704.8	2702	2701.1	2700.2	2524.5	2524.3	2524.2	2524.1
i-Pentane	72.1488	0.251	0.228	0.2168	3535.98	3531.68	3530.24	3528.83	3265.54	3265.08	3264.89	3264.73
i-Propylbenzene	120.19	0	0	0	0	0	0	0	0	0	0	0
i-Octane	114.23	0	0	0	0	0	0	0	0	0	0	0
Methane	16.0425	0.049	0.0447	0.0436	892.97	891.56	891.09	890.63	802.82	802.69	802.65	802.6
Methyl Alcohol	32.042	0.4764	0.3578	0.3286	766.59	765.09	764.59	764.09	676.44	676.22	676.14	676.06
Methylecyclo C5	84.161	0.313	0.2811	0.2702	3977.04	3972.46	3970.93	3969.44	3705.34	3705.59	3705.86	3706.6
Methylecyclo C6	98.188	0.3808	0.3376	0.3256	4600.64	4602.35	4604.09	4609.34	4292.53	4292.78	4293.06	4293.82
2-Methylhexane	100.21	0	0	0	0	0	0	0	0	0	0	0
3-Methylhexane	100.21	0	0	0	0	0	0	0	0	0	0	0
m-Xylene	106.167	0	0	0	0	0	0	0	0	0	0	0
n-Butane	58.1222	0.2069	0.1871	0.1783	2883.82	2879.76	2878.57	2877.4	2658.45	2657.6	2657.45	2657.32

Table B-2 ISO Component Data Table

Component Name	Molar Mass	Sum Factor (0°C)	Sum Factor (15°C)	Sum Factor (20°C)	CVSup kJ/Mol (0°C)	CVSup kJ/Mol (15°C)	CVSup kJ/Mol (20°C)	CV Sup kJ/Mol (25°C)	CV Inf kJ/Mol (0°C)	CV Inf kJ/Mol (15°C)	CVInf kJ/Mol (20°C)	CV Inf kJ/Mol (25°C)
n-Decane	142.2817	0.7523	0.645	0.614	6842.69	6834.9	6832.31	6829.77	6346.88	6346.14	6345.85	6345.59
n-Heptane	100.2019	0.4123	0.3661	0.3521	4862.87	4857.18	4855.29	4853.43	4502.28	4501.72	4501.49	4501.3
n-Hexane	86.1754	0.3286	0.295	0.2846	4203.23	4198.24	4196.58	4194.95	3887.71	3887.21	3887.01	3886.84
n-Nonane	128.2551	0.6221	0.5385	0.5148	6182.91	6175.82	6173.46	6171.15	5732.17	5731.49	5731.22	5730.99
n-Octane	114.2285	0.5079	0.445	0.4278	5522.4	5516.01	5513.88	5511.8	5116.73	5116.11	5115.87	5115.66
n-Pentane	72.1488	0.2864	0.251	0.2345	3542.89	3538.6	3537.17	3535.77	3272.45	3272	3271.83	3271.67
Neohexane	86.177	0.2898	0.2627	0.255	4185.84	4180.83	4179.15	4177.52	3870.32	3869.8	3869.59	3869.41
Neopentane	72.15	0.2387	0.2121	0.2025	3521.72	3517.43	3516.01	3514.61	3251.28	3250.83	3250.67	3250.51
Nitrogen	28.0134	0.0224	0.0173	0.0173	0	0	0	0	0	0	0	0
NO2	46.0006	0	0	0	0	0	0	0	0	0	0	0
NO	30.006	0	0	0	0	0	0	0	0	0	0	0
N2O	44.02	0	0	0	0	0	0	0	0	0	0	0
o-Xylene	106.167	0.5128	0.4427	0.4231	4602.17	4598.64	4597.48	4596.31	4376.8	4376.48	4376.34	4376.23
Oxygen	31.9988	0.0316	0.0283	0.0265	0	0	0	0	0	0	0	0
1-Pentene	70.14	0.249	0.2258	0.2191	3381.29	3377.75	3376.57	3375.42	3155.92	3155.59	3155.45	3155.34
Propane	44.0956	0.1453	0.1338	0.1288	2224.01	2221.1	2220.13	2219.17	2043.71	2043.37	2043.23	2043.11
Propadiene	40.065	0.1414	0.1304	0.1265	1945.25	1943.96	1943.53	1943.11	1855.1	1855.09	1855.08	1855.08
Propylene	42.0797	0.1378	0.1265	0.1225	2061.57	2059.43	2058.72	2058.02	1926.35	1926.13	1926.05	1925.97

Table B-2 ISO Component Data Table

Component Name	Molar Mass	Sum Factor (0°C)	Sum Factor (15°C)	Sum Factor (20°C)	CVSup kJ/Mol (0°C)	CVSup kJ/Mol (15°C)	CVSup kJ/Mol (20°C)	CV Sup kJ/Mol (25°C)	CV Inf kJ/Mol (0°C)	CV Inf kJ/Mol (15°C)	CVInf kJ/Mol (20°C)	CV Inf kJ/Mol (25°C)
Propyne	40.065	0	0	0	0	0	0	0	0	0	0	0
p-Xylene	106.167	0	0	0	0	0	0	0	0	0	0	0
Sulfur Dioxide	64.065	0.1549	0.1449	0.1414	0	0	0	0	0	0	0	0
Styrene	104.15	0	0	0	0	0	0	0	0	0	0	0
Toluene	92.141	0.3886	0.3421	0.3286	3952.72	3949.81	3948.84	3947.89	3772.42	3772.08	3771.95	3771.83
Trans-2-Butene	56.108	0.1975	0.1789	0.1761	2711.1	2708.3	2707.4	2706.4	2530.8	2530.5	2530.5	2530.3
Triptane	100.21	0	0	0	0	0	0	0	0	0	0	0
Water	18.0153	0.2646	0.2345	0.2191	45.074	44.433	44.224	44.016	0	0	0	0



## APPENDIX C, DATA COMPUTATIONS

### C.1 DATA ACQUISITION

The 2350A GC Controller performs a 12-bit analog to digital (A/D) conversion every 25 milliseconds on channel 0 during an analysis period. This is the period when the left side of the display is counting the elapsed time of the analysis. The fixed number on the right side of the display is the total cycle time.

Exactly 40 equi-spaced data samples are taken every second for analysis by the controller. A sampling frequency of 40 Hertz (Hz) was chosen to reduce 60 Hz normal mode noise. After each point on the chromatograph signal is sampled, the resulting number is stored in a buffer area in the controller memory for processing. During the analysis, only the last 256 data points are available for processing. Because the data analysis is done as the signal is sampled (in real-time), only a limited number of past data samples is required to analyze any signal.

As a part of the data acquisition process, groups of incoming data samples are averaged together before storing to the controller memory for processing. Non-overlapping groups of N samples are averaged and stored and thus reduce the effective incoming data rate to 40/N samples/second. For example, if  $N = 5$ , then a total of 40/5 or 6 (averaged) data samples are stored every second. The value for the variable N is determined by the selection of a Peak Width parameter (PW). The relationship is:

$$N = PW$$

where PW is given in seconds. All the various details in the analysis process are independent of the value of N. Allowable values of N are one to 63 which corresponds to values of PW from 2 to 63 seconds.

The variable N is known as the integration factor. This term is used because N determines how many points are averaged or integrated to form a single value. The integration of data upon input before storing serves two purposes. First, the statistical noise on the input signal is reduced by the square root of N. In the case of  $N = 4$ , a noise reduction of two would be realized. Secondly, the integration factor controls the bandwidth of the chromatograph signal. It is necessary to match the bandwidth of the input signal to that of the analysis algorithms in the 2350A. This prevents small, short duration perturbations from being recognized as true peaks by the program. It is therefore important to choose a Peak Width corresponding to the narrowest peak in a group under consideration.

## **C.2 PEAK DETECTION**

For normal area or peak height concentration evaluation, the determination of a peak's start, peak point, and end is automatic. The manual determination of start and end points is used only for area calculations in the Forced Integration mode. Automatic determination of peak onset or start is initiated whenever Integrate Inhibit is turned off. Analysis is started in a region of signal quiescence and stability such that the signal level and activity can be considered as baseline values. It is important that this be the case because the assumption is made by the 2350A software.

Having initiated a peak search by turning Inhibit off, the 2350A Controller performs a point by point examination of the signal slope. This is achieved by using a digital slope detection filter which is a combination low pass filter and differentiator. The output of this detector is constantly compared to a system constant entered by the operator called Slope Sensitivity. A default value of eight is assumed if no entry is made. Lower values make peak onset detection more sensitive and higher values make detection less sensitive. Higher values (20 to 100) would be appropriate for noisy signals, e.g. high amplifier gain. Peak termination is determined by the same application of this detector to the signal, but in the reverse sense. Onset is defined where the detector output exceeds the baseline constant, but termination is defined subsequently where the detector output is less than the same constant.

Sequences of fused peaks are also automatically handled. This is done by testing each termination point to see if the region immediately following it satisfies the criteria of a baseline. A baseline region must have a slope detector value less than the magnitude of the baseline constant for a number of sequential points. When a baseline region is found, this terminates a sequence of peaks. A zero reference line for peak height and area determination is established by extending a line from the point of the onset of the peak sequence to the point of the termination. The values of these two points are found by averaging the four integrated points just prior to the onset point and just after the termination points respectively.

The zero reference line will, in general, be non-horizontal and thus compensates for any linear drift in the system from the time the peak sequence starts until it ends. In a single peak situation, peak area is the area of the component peak between the curve and the zero reference line. The peak height is the distance from the zero reference line to the maximum point on the component curve. The value and location of the maximum point is determined from quadratic interpolation through the three highest points at the peak of the discrete valued curve stored in 2350A. This interpolation technique is used both for peaks as well as valleys (minimum points) in fused peak sequences. In the latter case, lines are dropped from the interpolated valley points to the zero reference line to partition the fused peak areas into individual peaks. The use of quadratic interpolation improves both area and height calculation accuracy and eliminates the effects of variations in the integration factor on these calculations.

While calibrating, the controller may run several analyses of the calibration stream. Using entries from an example program, five analyses would be run. Since only the last three are to be averaged, data from runs one and two are not saved. Results are stored on the third run. Data from runs four and five are added to that stored for run three.



### C.3 ANALYSIS COMPUTATIONS

There are two basic analysis algorithms included in the controller:

- Area Analysis – calculates area under component peak
- Peak Height Analysis – measures height of component peak

#### C.3.1 CONC. ANALYSIS WITH RESPONSE FACTOR

##### Calibration

The concentration calculations discussed as follows require a unique response factor for each component in an analysis. These factors may be manually entered by an operator or automatically calculated by calibrating the system.

## NOTICE

Equation C-1 uses an external standard.

*Equation C-1 Response Factor Calculation*

$$ARF_n = \frac{Area_n}{Cal_n} \quad \text{or} \quad HRF_n = \frac{Ht_n}{Cal_n}$$

where

$ARF_n$	area response factor for component “n” in area per mole percent (%)
$HRF_n$	height response factor for component “n”
$Area_n$	area associated with component “n” in calibration gas
$Ht_n$	height associated with component “n” in mole percent in calibration gas
$Cal_n$	amount of component “n” in mole percent of calibration gas

Calculated response factors are stored by the controller for use in the concentration calculations, and are printed out in the configuration and calibration reports.

*Equation C-2 Average Response Factor*

$$RFAVG_n = \frac{\sum_{i=1}^k RF_i}{k}$$

where

$RFAVG_n$	area or height average response factor for component "n"
$RF_i$	area or height response factor for component "n" from the calibration run
k	number of calibration runs actually used to calculate the response factors

The percent deviation of new RF average from old RF average is calculated in the following manner:

*Equation C-3 Percent Deviation*

$$deviation = \left[ \frac{RF_{new} - RF_{old}}{RF_{old}} \times 100 \right]$$

where the absolute value of percent deviation for alarm has been previously entered by the operator.

**Calc. in Mole Percent w/o Normalization**

Once response factors have been determined by the controller or entered by the operator, component concentrations are determined for each analysis using the following equations:

*Equation C-4 Response Factor Calculation*

---

$$CONC_n = \frac{Area_n}{ARF_n} \quad \text{or} \quad CONC_n = \frac{Ht_n}{HRF_n}$$

where

CONC <sub>n</sub>	concentration of component “n” in mole percent
AREA <sub>n</sub>	area of component “n” in unknown sample
ARF <sub>n</sub>	response factor of component “n” calculated from area of calibration sample. Units are area per mole percent
Ht <sub>n</sub>	peak height of component “n” in unknown sample
HRF <sub>n</sub>	response factor of component “n” calculated from peak height of calibration sample. Units are height per mole percent

Note that the average concentration of each component will also be calculated when data averaging is requested.

Component concentrations may be input through analog inputs 1 to 4 or may be fixed. If a fixed value is used, the calibration for that component is the mole percent that will be used for all analyses:.

*Equation C-5 Concentration Calculations with Normalization*

---

$$CONCN_n = \frac{CONC_n}{\sum_{i=1}^k CONC_i} \times 100$$

where

$CONCN_n$	normalized concentration of component “n” in percent of total gas concentration
$CONC_n$	non-normalized concentration of component “n” in mole percent
$CONC_i$	non-normalized concentration (in mole percent) from each of the “k” components to be grouped into this normalization
k	number of components to be included in the normalization

## C.4 POST ANALYSIS COMPUTATIONS

### C.4.1 Liquid Equivalent Computations

The equivalent liquid volume, in gallons per 1000 standard cubic feet (GPM) is given by:

*Equation C-6 Equivalent Liquid Volume (GPM)*

$$GPM_n = CONC N_n \times LCF_n \times \frac{BASEPRS}{14.73} \times \frac{BASETEMP + 459.67}{60 + 459.67}$$

where

$GPM_n$	gallons/1000 standard cubic feet of component "n"
$CONC N_n$	normalized (if selected) concentration of component "n"
$LCF_n$	liquid equivalent conversion factor for component "n" at 14.73 PSIA and 60 degrees F
BASE PRS	base (contact) Pressure specified; defaults to 14.73

### C.4.2 Heating Value Calculations

(a) Dry Gross BTU of Total Gas

*Equation C-7 Dry Gross BTU Value of Total Gas*

$$DRYBTU|CF = \frac{\sum_{n=1}^P [(CONC N)_n (BTU|CF)_n]}{100}$$

where

DRYBTU/ CF	uncorrected dry BTU content per cubic foot of total gas sample
$CONC N_n$	normalized (if selected) concentration of component "n", calculated from peak analysis
$BTU/CF_n$	energy content per cubic foot of component "n", stored in permanent memory

- P total number of components to be used in calculation of total BTU/CF
- “100” removed the “100” factored into the calculation of the concentration earlier in the analysis

### (b) Ideal Relative Density

*Equation C-8 Ideal Relative Density of Total Gas Sample*

$$TOTALRD = \frac{\sum_{n=1}^{n=P} CONC_n(RD_n)}{100}$$

where

- $RD_n$  relative Density of component “n”
- TOTAL RD relative Density of total gas sample
- $CONC_n, P, 100$  are defined in “1.” preceding

### (c) Real (corrected) Relative Density

The ideal gas relative density,  $D_I$  is corrected to the real gas relative Density,  $D_R$ , by dividing by the compressibility factor,  $Z$ , for gas mixture at 60 °F and one atmosphere pressure and multiplying by the compressibility factor of air at the same conditions:

*Equation C-9 Real Gas Relative Density*

$$D_R = \frac{D_I Z_{b(air)}}{Z_{b(gas)}}$$

where

$D_I$	ideal gas relative density ()
$Z_{b(\text{air})}$	compressibility factor of air, or 0.99959
$Z_{b(\text{gas})}$	compressibility factor of gas mixture

#### (d) Compressibility Factor Dry BTU

Compressibility uses calculations from AGA Report No. 8 (1992) errata (1993) “Compressibility Factors of Natural Gas and other related Hydro-Carbon Gases”.

*Equation C-10 Corrected Dry BTU Value*

$$\underline{CORRDRYBTU = \frac{DRYBTU}{Z}}$$

where

DRYBTU	value from <a href="#">Equation C-7</a>
Z	compressibility factor ( <a href="#">see Equation C-9</a> )
BASE PRS	base (contract) pressure specified; defaults to 14.73 PSIA

#### (e) Corrected Saturated BTU

*Equation C-11 Corrected Saturated BTU Value of Total Gas*

$$\underline{CORRSATBTU = \frac{(DRYBTU)(0.9826)}{Z}}$$

where

DRYBTU	value from <a href="#">Equation C-7</a>
CORRSATBTU	corrected saturated BTU content per cubic foot of total gas sample at base conditions of BASE PRS and 60 °F
Z	compressibility of total gas as calculated in <a href="#">Equation C-10</a>
BASEPRS	base (contract) pressure specified; defaults to 14.73 PSIA

#### (f) Compressibility and Base Pressure

Compressibility and base pressure corrections for Dry BTU are:

*Equation C-12 Dry BTU at Base Pressure*

---


$$CorrDryBTU = \left( \frac{DryBTUatBasePressure}{Z} \right) \left( \frac{ContractPressure}{BasePressure} \right)$$

where

CORRDRYBTU	value from <a href="#">Equation C-7</a>
Z	compressibility factor ( <a href="#">see Equation C-10</a> )
BASE PRESSURE	base (contract) pressure specified; defaults to 14.73 PSIA

#### (g) BTU Calculations

Note that the BTU calculations apply to  
Gross dry, saturated, actual BTU and  
Net dry, saturated, and actual BTU

*Equation C-13 BTU Calculations*

---


$$GrossActualBTU(corr) = GrossDryBTU(corr) \times \left( 100 - \frac{(WVC)}{100} \right)$$



where

WVC Water volume content (provided by a “live analog input”)

*Equation C-14 Wobbe Index Calculation*

$$WI = \frac{CORR(GROSS)BTU}{\sqrt{RD}}$$

where

W.I.	Wobbe index value
CORRGROSSBTU	Corrected Dry BTU for total gas Sample as calculated in <a href="#">Equation C-10</a>
RD	real Relative Density as calculated in <a href="#">Equation C-9</a>

## NOTICE

All components in the sample must be measured in order to calculate weight percent.

*Equation C-15 Weight Percent Calculation*

$$WTpercent_n = \frac{(CONC_n)(MW_n)}{\sum_{i=1}^k (CONC_i)(MW_i)} \times 100$$

where

WTpercent <sub>n</sub>	weight percent of component “n”
CONC <sub>n</sub>	concentration in mole percent of component “n”
Mw <sub>n</sub>	molecular weight of component “n”
$\sum_{i=1}^k$	sum of weights of all components in sample

*Equation C-16 Average Molecular Weight*

$$AVGMW = \frac{\sum_{i=1}^{\kappa} (CONC_i)(MW_i)}{\sum_{i=1}^{\kappa} (CONC_i)}$$

where

AVGMW                    average molecular weight

$\sum_{i=1}^{\kappa}$                         sum of weights of all components in sample

*Equation C-17 Liquid Volume Percent*

$$LVpercent = \frac{(WTpercent_n) \div (D_n)}{\sum_{i=1}^{\kappa} (WTpercent_i) \div (D_i)} \times 100$$

where

LV percent                liquid volume

WT percent                weight percent

D                             density

$\sum_{i=1}^{\kappa}$                         sum of all components in sample

**NOTICE**

**All components in the sample must be measured in order to calculate liquid volume percent from mole percent.**

*Equation C-18 Reid Vapor Pressure*

$$RVP = \frac{\sum_{i=1}^k (CONC_i)(VP_i)}{100}$$

where

RVP	reid vapor pressure
CONC <sub>i</sub>	normalized concentration of component “i” in mole percent
VP <sub>i</sub>	vapor pressure at 100 F of component “i” (GPA2145 = 94)

**NOTICE**

All components in the sample must be measured to calculate LRDT.

*Equation C-19 Liquid Relative Density*

$$LRD_T = \frac{\sum_{i=1}^k (LVpercent_i)(LRD_i)}{100}$$

where

LRD <sub>T</sub>	liquid relative density of sample, relative to water at 60 °F
LRD <sub>i</sub>	liquid relative density of component “i” (GPA2145-94)
LVpercent	liquid volume percent from <a href="#">Equation C-18</a>

*Equation C-20 Liquid Density*

$$LD_T = \frac{\sum_{i=1}^k (LV_i)(LD_i)}{100}$$

where

$LD_T$  liquid density of total sample in pounds per gallon

$LD_i$  liquid density of component "i". (GPA 2145-94)

$LV_i$  liquid volume percent

*Equation C-21 Gas Density*

$$GD = (RD)(76.4976)$$

where

$GD$  gas density in lb/1000 ft<sup>3</sup>

$RD$  relative density (relative to air)

76.4976 density of air at 14.73 PSIA and 60 °F, in lb/1000 ft<sup>3</sup>

**NOTICE**

**All components on sample must be measured to calculate Liquid Density.**

### C.4.3 Multi-Level Calibration

The properties of each gas component can be viewed using the Component Data menu. Included with the component properties in the Component Data Table are four coefficients labeled Multi-Level Calib 'a', 'b', 'c', and 'd' for each component. If these parameters are all zero, then linear calibration is used. See [Section C.3.1](#) for the response factor calculations.

If any of these parameters have a value other than zero, then multi-level, or polynomial calibration is used for that component.

The response factors are then calculated as:

*Equation C-22 Multi-Level Calibration*

---


$$ResponseFactor = \frac{aP^3 + bP^2 + cP + d}{CalibrationConcentration \text{ (mol \%)}}$$

where

P                    peak size (Area or Height as selected by the Operator); from average calibration runs

Coefficients:      Calculated Offline.  
A,B,C, and D      Entered after Multi-Level Calibration using several calibration gases (typically seven gases)

**1. Note: If the coefficient values are correct values, the response factor will be close to one.**

The mole% value in the sample gas is then calculated as

*Equation C-23 Mole% Value*

$$\text{Mole \%} = \frac{aP^3 + bP^2 + cP + d}{\text{responsefactor}}$$

where

P                      peak size measured in Sample Gas

#### C.4.4 Indirect Calibration

Component gases which are **NOT** found in the calibration gas, but may be found in the sample gas, can be assigned a response factor which is a fixed multiple (the Relative Response Factor to a Reference Component) that **IS** found in the calibration gas.

The Relative Response Factors and Reference Component Values are included in the Component Data Table (following the Multi-Level Calibration coefficients) [see Appendix B](#).

If the Reference Component is **None**, then normal (direct) calibration is used.

If the Reference Component is defined, (e.g. Propane) then the mole% value for the indirect component (e.g. neoC5), is calculated as:

*Equation C-24 Mole% Value Indirect Component*

$$\text{mole\% (neoC5)} = \text{mole\% (Propane)} \left( \frac{P(\text{neoC5})}{P(\text{Propane})} \right) (\text{RRFneoC5})$$

where

P      peak size

RRF    Relative Response Factor

*This page is intentionally left blank.*



## APPENDIX D, ANALOG OUTPUT CAL. FOR 2350A

The initial analog output adjustment will be set at the factory before shipment at standard values (4-20 mA or 1-5 V). It may be necessary to check and/or adjust these values, depending on output cabling or impedance. The adjustment may require two persons if the units are some distance apart. It will require a good digital meter to check the zero and full scale values at the receiving end. The scale or span value can be adjusted by a PC with MON2000 software when the values are known at the receiving end.

### NOTICE

The 4-20 mA outputs are calibrated similarly except the current is measured instead of the voltage.

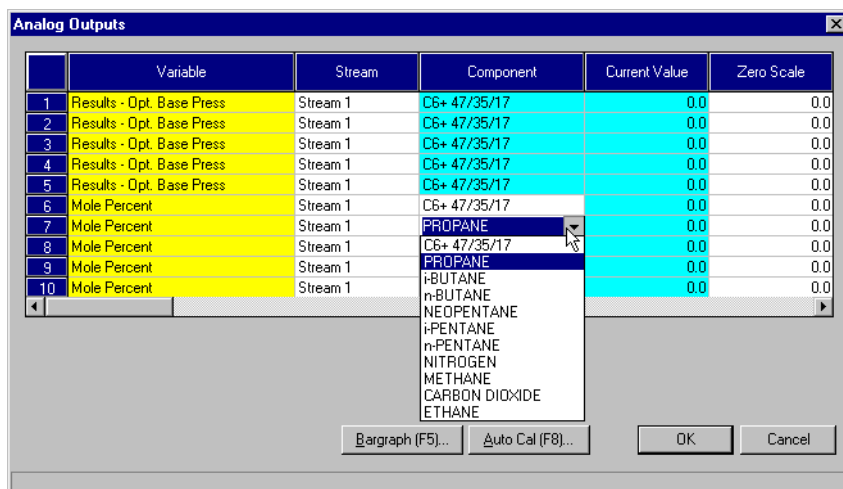
It is possible to calibrate the analog outputs using different engineering units. Two examples are described below using both volts and percentages.

#### D.1 CALIBRATING BY VOLTS

This example assumes that an analog output channel needs to be calibrated to a span of 1-5 V.

To calibrate an analog output by adjusting the voltage,

1. Use the *Application > Analog Outputs* menu to access this function.
2. The Analog Outputs dialog appears.



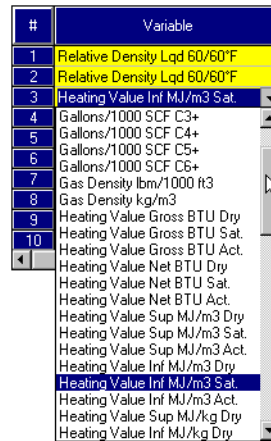
### 3. Select the channel to be calibrated.

Output channels 1 and 2 can be scaled from either 4-20 mA or 1-5 V. Channels 3 to 10 are scaled from 4-20 mA.

## CAUTION


Although output channels for direct voltage measurement exist for analog output channels 1 and 2, it is recommended that they *not* be used for calibration purposes. Instead, use the current-out terminals and the 250-ohm resistor as described.

- To change a variable assignment, click the appropriate Variable cell. Use the provided pull-down menu and click the desired variable to select it.







- For voltage values, set *Zero Scale* to “1.0” and *Full Scale* to “5.0”.

If the channel is calibrated in milliamperes, set *Zero Scale* to “4” and *Full Scale* to “20”.

- Set the *Fixed/Var* parameter to “Fixed”.
- Set the *Fixed Value* to “0.0”.
- Set *Zero Scale Adjustment* and the *Full Scale Adjustment* to “0.0”.
- Click the  button to accept your changes and exit from the Analog Outputs dialog.
- Connect a 250-ohm resistor across the signal at the input of the device where this analog output is used. Connect a Voltmeter across the resistor and measure the result.
- Return to the Analog Outputs dialog and reselect the channel being calibrated.
- Set the *Fixed Value* to the Full Scale value entered in [Step 5](#).

## NOTICE

Your Voltmeter reading should be close to 1.0 V but does not have to be exactly 1.0 V. If the reading is negative, reverse the leads.

13. Click the  button to accept your changes and exit from the Analog Outputs dialog.
14. Look at the voltmeter again and record the full scale reading.
15. Return to the Analog Outputs dialog and reselect the channel being calibrated.
16. Change the *Zero Scale Adjustment* to the Zero Scale voltage reading and the *Full Scale Adjustment* to the Full Scale voltage reading.
17. Click the  button to accept your changes and exit from the Analog Outputs dialog.
18. Return to the Analog Outputs dialog and reselect the channel being calibrated.
19. To quickly verify your changes, enter the midpoint of your range (e.g., 3) for the *Fixed Value*. Click the  button to accept your change. The resulting voltage output should be close to span midpoint (e.g., 3).
20. Return to the Analog Outputs dialog and reselect the channel being calibrated.
21. Set the *Fixed/Var* parameter to “Var” and the *Fixed Value* to “0.0”.
22. Click the  button to accept your changes.

The voltage output could change slightly from time to time and the MON2000 software will now maintain the correct span.

## NOTICE

Your voltmeter reading should be very close to 5.0 Volts. MON2000 will adjust the scale so the span will be 4 Volts and scale accordingly.

## D.2 CALIBRATING BY PERCENTAGES

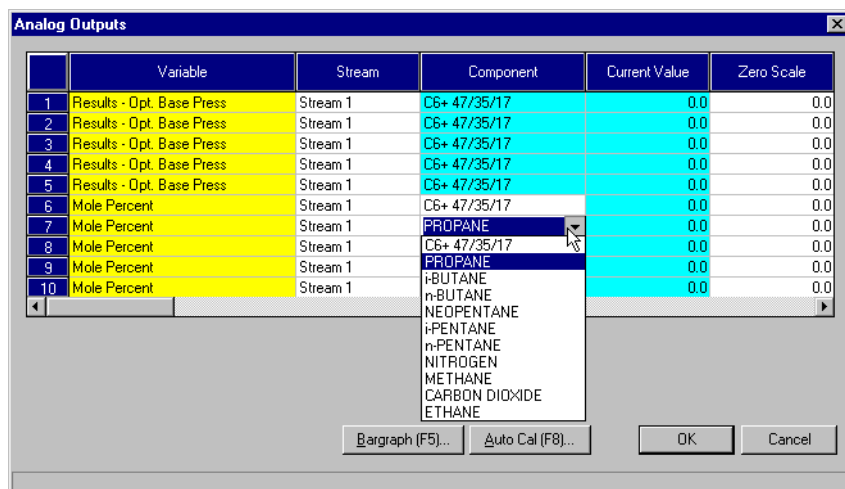
This second example, shown below, demonstrates that it is also possible to calibrate your outputs as a percentage. For instance, you may wish to read directly values that may be scaled from 0 to 1200. Your voltage span is scaled from 1 to 5 volts so the range is approximately 4 Volts. Thus, 1200 divided by 4 equals 300 units per volt. If you equate the difference as a percentage, the midpoint in units equals 600, or approximately 3 volts.

With this information in mind, you want to set zero units equal to 1.00 V and 1200 units to 5.00 V and let the software adjust the span as you calibrate.

This example assumes that an analog output channel needs to be calibrated to a span of 0 to 1200.

To calibrate by percentages,

1. Use the *Application > Analog Outputs* menu to access this function.
2. The Analog Outputs dialog appears.



3. Select the channel to be calibrated.

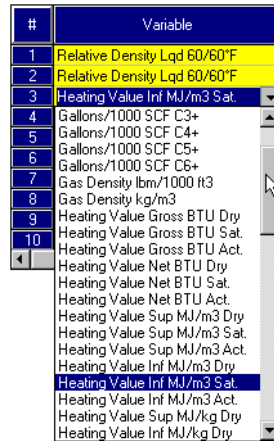
Output channels 1 and 2 can be scaled from either 4-20 mA or 1-5 V. Channels 3 to 10 are scaled from 4-20 mA.

### CAUTION

Although output channels for direct voltage measurement exist for analog output channels 1 and 2, it is recommended that they *not* be used for calibration purposes. Instead, use the current-out terminals and the 250-ohm resistor as described.

All can be scaled with a percentage.





- To change a variable assignment, click the appropriate Variable cell. Use the provided pull-down menu and click the desired variable to select it.



- Set *Zero Scale* to “0” and *Full Scale* to “1200”.
- Set the *Fixed/Var* parameter to “Fixed”.
- Set *Fixed Value* to “0.0”.
- Set *Zero Scale Adjustment* and *Full Scale Adjustment* to “0.0”.
- Click the  button to accept your changes and exit from the Analog Outputs dialog.
- Connect a 250-ohm resistor across the signal at the input of the device where this analog output is used. Connect a Voltmeter across the resistor and measure the result.
- Return to the Analog Outputs dialog and reselect the channel being calibrated.
- Set the *Fixed Value* to the Full Scale value entered in [Step 5](#).

## NOTICE

Your Voltmeter reading should be close to 1.0 V but does not have to be exactly 1.0 V. If the reading is negative, reverse the leads.

13. Click the  button to accept your changes and exit from the Analog Outputs dialog.
14. Look at the voltmeter again and record the full scale reading.
15. Return to the Analog Outputs dialog and reselect the channel being calibrated.
16. Change the *Zero Scale Adjustment* to the zero scale voltage reading and the *Full Scale Adjustment* to the full scale voltage reading.
17. Click the  button to accept your changes and exit from the Analog Outputs dialog.
18. Return to the Analog Outputs dialog and reselect the channel being calibrated.
19. To quickly verify your changes, enter the midpoint of your range (e.g., 600) for the *Fixed Value*. Click the  button to accept your change. The resulting voltage output should be close to span midpoint (e.g., 3).
20. Return to the Analog Outputs dialog and reselect the channel being calibrated.
21. Set the *Fixed/Var* parameter to “Var” and the *Fixed Value* to “0.0”.
22. Click the  button to accept your changes.

The voltage output could change slightly from time to time and the MON2000 software will now maintain the correct span.

## NOTICE

Your voltmeter reading should be very close to 5.0 Volts. MON2000 will adjust the scale so the span will be 4 Volts and scale accordingly.



## APPENDIX E, UPGRADE 2350A GC S/W AND 2350 EPROMS

### CAUTION

To upgrade the Model 500 2350A (GC) software and the 2350 EPROMs, perform all steps in the order they appear in this appendix.

Before beginning the upgrade procedure, ensure that you have identified which standard (i.e., factory-released) application file was used to form the current user application for this GC. See [Section E.10](#) for more information on standard applications.

### E.1 CONNECT TO GC AND HALT ANALYSIS

1. Ensure that the MON2000 software is running and you are connected to the GC that is to be upgraded.

Use the *File > Connect* menu to access this function. See [Section 2.10.1](#) for more information.

2. Use MON2000 to halt any ongoing analysis or calibration runs.

Use the *Control > Halt* menu to access this function. See [Section 4.3](#) for more information.

### E.2 OFFLINE EDIT TO UPLOAD APP. & RENAME

1. Use MON2000 to upload (from the GC unit) to the PC the most current parameters that are in use at the GC.

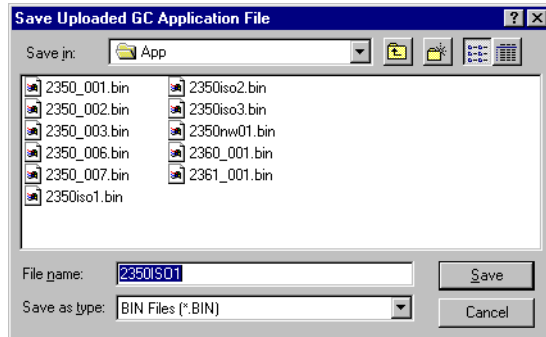
Use the *File > Offline Edit > Upload Application* menu to access this function.

2. A menu of stored application files appears. Double-click the desired file.

### NOTICE

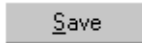
When halted GC runs have finished, the status for Detector 1 mode will indicate Idle (see GC Status bar; see [Section 3.3](#)).

3. The Save Uploaded GC Application File dialog appears.



Use this dialog to assign a new file name to the GC Application file that is the target for uploading.


For clarity, you could name this file “OLD.bin” to distinguish it from the upgraded application file.

Press the ENTER key or click the  button to continue.

4. The Upload Application process begins. This process usually takes about 15 minutes to complete.

MON2000 automatically disconnects from the GC after the Upload Application process has finished.

5. Use the *File > Exit* menu to close MON2000.

Or, you can exit MON2000 by pressing the ALT-F X keys, or click the  button on the main window.

## NOTICE

The existing file name of the GC application file for the connected GC displays in the *File name* field.

### E.3 UPGRADE USER-DEFINED APPLICATIONS

Follow the installation instructions provided in [Section 2.2](#) to upgrade the MON2000 software and/or a standard application file.

#### **CAUTION**

**Do not delete any existing MON2000 program or GC application files from the PC hard drive. The upgrade process uses information from these files and automatically overwrites any outdated program file.**

Use the Update BIN utility that is installed with the MON2000 software to upgrade a GC application that contains user-defined data (such as components). The Update BIN program allows you to upgrade an application that is either on disk or “live” at the GC Controller. See the following sections for details.

### E.4 UPGRADE FROM DISK

To upgrade a user-defined application file (\*.BIN) located on your PC hard drive or on a floppy disk,

#### **CAUTION**

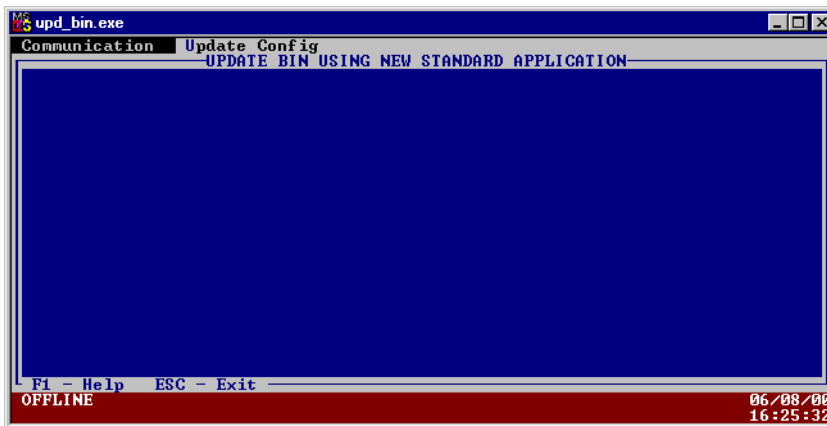
**It is recommended that you save a copy of your application file before performing the upgrade.**

1. Launch the Update BIN software by either:

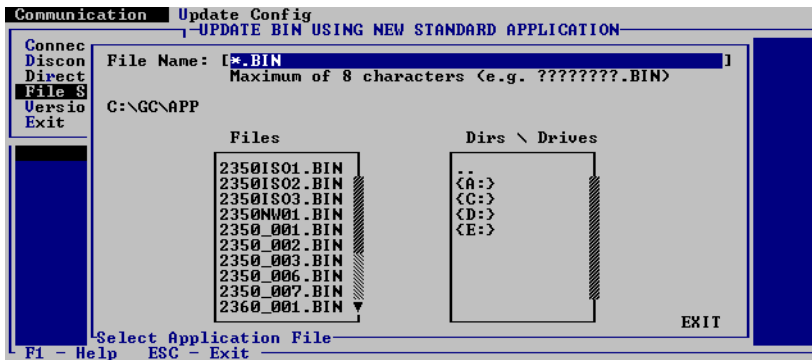
- clicking the  Start button and using the *Programs > MON2000 > Update BIN* menu
- double-clicking the Update BIN icon on your PC desktop



2. The Update BIN software program launches inside a DOS window.



3. Press the TAB key to access the Communication menu.
4. Use the ARROW keys to select the *File Selection* option, and then press ENTER.
5. The File Selection screen displays.

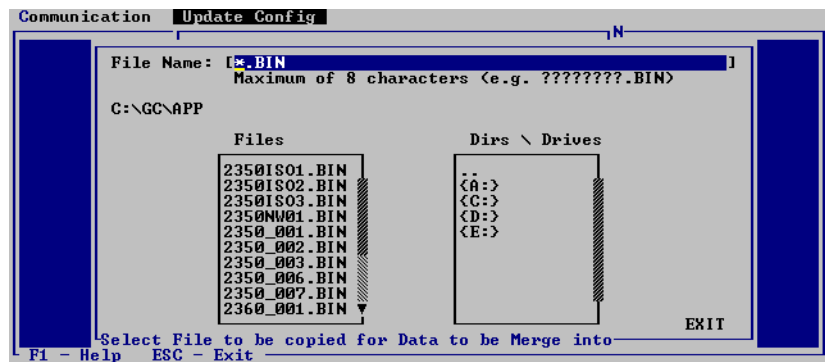


Use the TAB and ARROW keys to select the desired application file from disk. This file is the file you will be upgrading.

6. Press the TAB key to access the Upgrade Config menu.
7. Use the ARROW keys to select the *Merge* option, and then press ENTER.

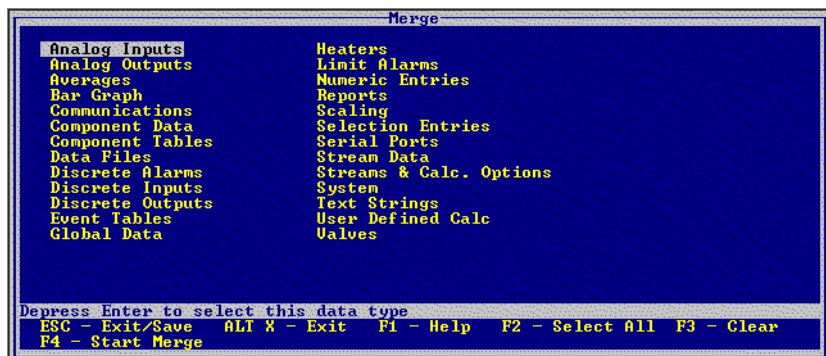


8. The File Selection screen displays.



Use the TAB and ARROW keys to select the desired application file from disk. This file is the new application file you wish to merge into the existing file (see Step 5).

9. The Merge screen displays.



10. Use the ARROW+ENTER keys to select the desired application settings to upgrade.

Press the SHIFT + ENTER keys to select multiple settings.

Press the F2 key to select all the available settings.

Press the F3 key to clear your selected settings.

11. Press the F4 key to begin the upgrade.

12. When the upgrade is done, press the ESC key or use the *Communication > Exit* menu to close the Update BIN program.

Ensure that you inspect the upgraded application file for any errors.



#### E.4.1 Upgrade from GC Controller

To upgrade a user-defined application file (\*.BIN) currently being used by the GC Controller,

### CAUTION

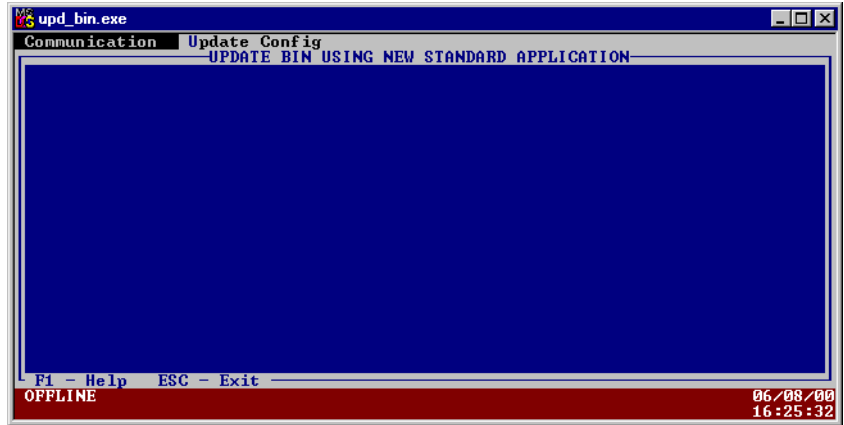
It is recommended that you upload a copy of your application file before performing the upgrade.

1. Launch the Update BIN software by either:

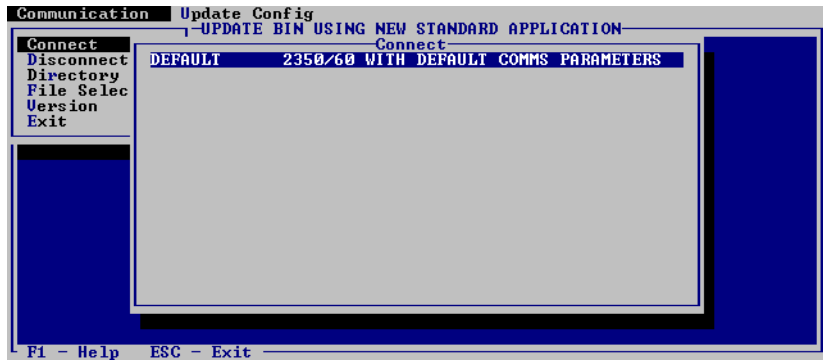
- clicking the  Start button and using the *Programs > MON2000 > Update BIN* menu
- double-click the Update BIN icon on your PC desktop



- The Update BIN software program launches inside a DOS window.



- Use the ARROW keys to select the *Connect* option, and then press ENTER.
- The Connect screen displays, listing the available GC units.

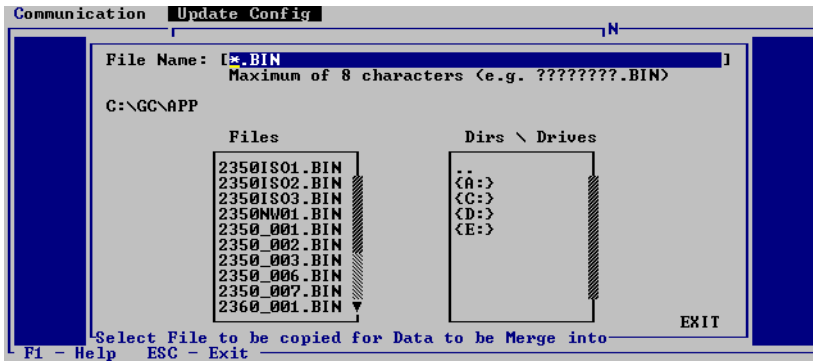


Use the ARROW keys to select the appropriate GC, and then press ENTER.

- Update BIN attempts to connect to the GC Controller.

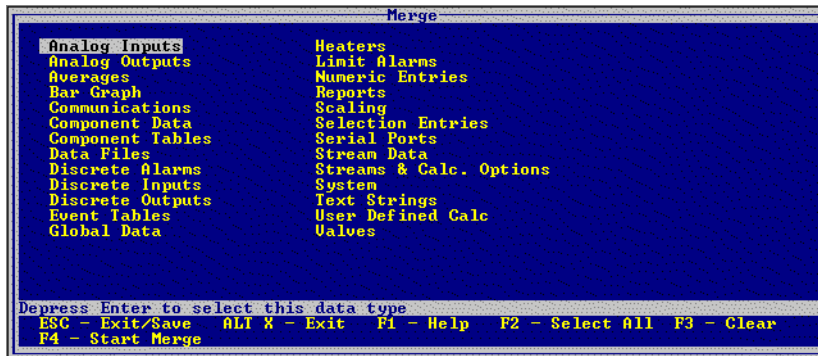
If the attempt fails, [see Section E.4.2](#) for information on configuring the communications parameters for Update BIN.

6. The File Selection screen displays.



Use the TAB and ARROW keys to select the desired application file from disk. This file is the new application file you wish to merge into the existing file (see [Step 5](#)).

7. The Merge screen displays.



8. Use the ARROW+ENTER keys to select the desired application settings to upgrade.

Press the SHIFT + ENTER keys to select multiple settings.

Press the F2 key to select all the available settings.

Press the F3 key to clear your selected settings.

9. Press the F4 key to begin the upgrade.



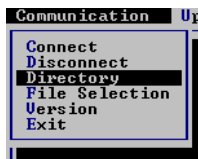


10. When the upgrade is done, use the *Communications > Disconnect* menu to cease communications with the GC unit.
11. Press the ESC key or use the *Communication > Exit* menu to close the Update BIN program.

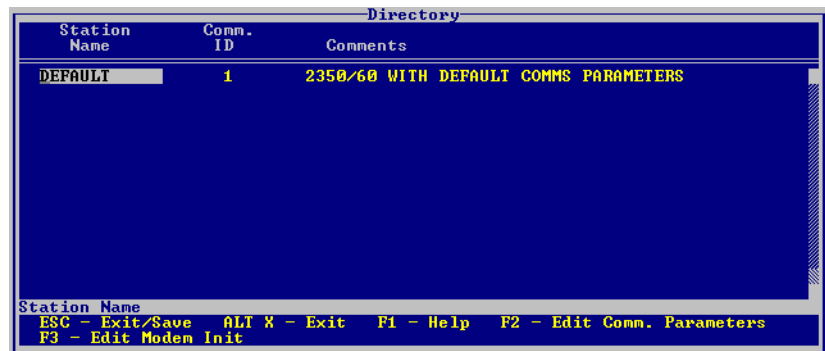
Ensure that you inspect the upgraded application file for any errors.

#### E.4.2 Configure GC Connection

To configure the GC communications parameters for the Update BIN software,



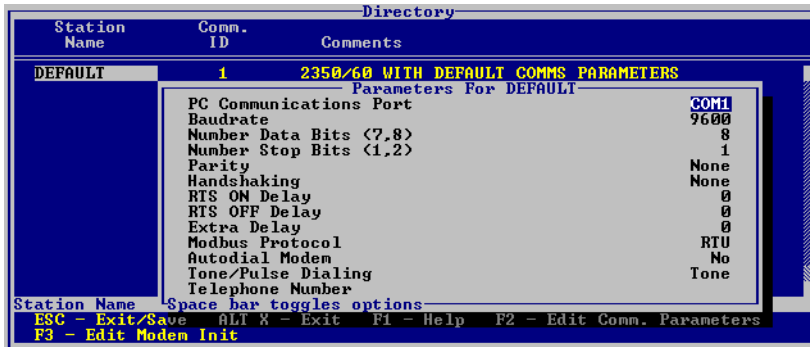
1. Use the *Communication > Directory* menu to access a list of communication settings for each GC unit.
2. The Directory screen displays.



3. Use the ARROW keys to select the desired GC unit and then press the F2 key to edit its communications parameters.

You can also press F3 to edit the modem initialization string.

4. The Parameters screen displays.



5. Use the ARROW keys and space bar to select the desired parameter and toggle between its options.
6. Press the ENTER key to accept your changes or press the ESC key to cancel.

## E.5 DISCONNECT POWER AND DISASSEMBLE



### PERSONELL AND EQUIPMENT

Failure to follow the instructions below, may cause injury to personnel or damage equipment.

Before you remove the cover from the GC Controller or access its internal electronics, switch OFF the AC power source to the GC Controller, either at the breaker box or the controlling power source switch.

Also, disconnect the AC power cord from J21 before continuing working on the unit.

1. Disconnect AC power from the GC Controller.

When you have access to the GC Controller Terminal Board (TB) for field wiring (accessed from the rear on rack-mount versions and behind the front cover of explosion-proof models) disconnect the AC power cord from J21 before continuing working on the unit.

2. For newer model 19-inch rack mount and retrofit GC Controllers, proceed as follows:
  - (a) Remove the (right) side access panel that is secured to the chassis with four thumbscrews.
  - (b) Unplug all cables connected to the boards in slots 2 through 6 of the Card Cage Assembly in order to access the SBC53 CPU Board.
  - (c) Proceed to [Step 3](#) below.

For the explosion-proof GC Controller or older rack mount GC Controllers, proceed as follows:

- (a) Access the GC Controller Terminal Board for field wiring.

On the explosion-proof GC Controller, remove outer housing bolts and lower the cover on its bottom hinge. The TB faces the front.

On rack mount GC Controllers, the TB is exposed and faces the rear.

- (b) Loosen the six thumbscrews that secure the TB. Then gently unplug the TB from its mating DIN connectors at the back, top of the board.
- (c) Lower the TB down (held in place by its ground straps at the bottom of the board) in order to expose the Card Cage Assembly.

- (d) Unplug the TB power supply cord from its connection at the Card Cage Assembly power supply.
  - (e) Loosen the four thumbscrews that secure the Card Cage Assembly to the chassis. Then remove the Card Cage Assembly away from its chassis mount so that it is easy to work on.
  - (f) Unplug all cables connected to the boards in slots 2 through 6 of the Card Cage Assembly in order to access the SBC53 CPU Board.
3. Remove the SBC53 CPU Board from slot number 2 (second from the top) of the Card Cage Assembly.

## E.6 REPLACE EPROMS/RESET CPU

1. For 2350 GC Controllers, locate the EPROMs that will be replaced: U18 and U19. They are near the card-connector edge of the SBC53 CPU Board.

### CAUTION

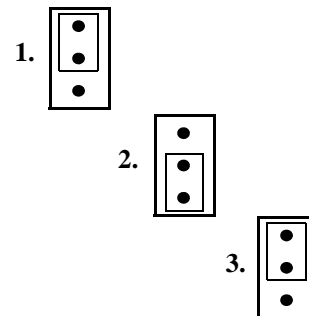
Carefully note which EPROMs are labeled ODD and EVEN and which sockets hold them:

socket U18 EVEN EPROM P/N 8-2350-001

socket U19 ODD EPROM P/N 8-2350-002

2. Remove, one at a time, each of the old EPROMs, and replace each with its upgrade EPROM.
3. Locate Jumper Pin Set J14. It is near the two EPROMs you have just replaced.

Note that Jumper Pin Set J14 has a single jumper shorting pins 1 and 2.



4. To reset the CPU registers, remove the jumper from J14 pins 1 and 2, and place it to short J14 pins 2 and 3.
5. After briefly shorting J14 pins 2 and 3, remove the jumper again. Place it back in its original position, shorting J14 pins 1 and 2.

## E.7 REASSEMBLY PROCEDURES

1. Place and securely plug the SBC53 CPU Board into slot number 2 of the Card Cage Assembly.
2. Reconnect all ribbon cables that were unplugged (see [Section E.5](#)).

Because the ribbon cables are arranged in layers, it important to reconnect them in the order listed below:

*Table E-1 2350 GC Ribbon Cables to Connect*

Part Number	System Interface Board connection	Cable Originating from Board
3-2350-063	J12	SBC53
3-2350-052	J9	SBC53
3-2350-062	J11	SBC53
3-2350-051	J4	SBC53
3-2350-064	J8	DSPI/O
3-2350-053	J10	DSPI/O
3-2350-054	J6	RTI1281
3-2350-055	J5	RTI1281

3. Return and secure the Card Cage Assembly its original position in the chassis mounting. Tighten the four screws.
4. Return and secure the field wiring TB in its original position. Tighten the six screws.
5. Reconnect the AC power cord to J21 on the TB, and restore AC power to the 2350A GC Controller.

## **E.8 SET-UP AND PROGRAMMING**

The purpose of this procedure is to define the CMOS table set-up and programming requirements for the CPU assembly and DiskOnChip.

### **E.8.1 Procedure**

1. Install the blank DiskOnChip into socket U1 on the CPU assembly, noting the orientation of pin 1.
2. Plug the floppy drive cable into J10 on the CPU assembly and plug the board into the card cage.
3. Plug the keyboard cable into J1 on the CPU assembly.
4. Turn on the power. When the video displays on the monitor, press the DELETE button to access the CMOS setup window.
  - (a) The Standard CMOS Setup window displays. Press the ENTER button.
  - (b) Set time and date by either PAGE UP, PAGE DOWN, or by entering the appropriate number value. After making the desired change, press ENTER.

(c) Change Drive C:\ to NONE by pressing PAGE DOWN. Verify that Drive A:\ is the only selected drive. Press ESCAPE, F10 (to save changes), Y (to verify that you want the changes to be made), then ENTER.

5. The CPU assembly will reboot and displays the Systems Configuration window. The speaker on the CPU will chirp and the monitor will prompt:

"ENTER NEW DATE (mm-dd-yy)". Press ENTER.

"ENTER NEW TIME:". Press ENTER.

The A:\> prompt is displayed. Verify that the programming disk is the current revision specified on the work order package and it insert into the floppy drive. Type **INSTALL**.

6. As the DiskOnChip is being programmed, the following information is displayed:

```
A:\> SYS C:
SYSTEM TRANSFERRED
```

```
A:\>CD IMAGE
A:\IMAGE>COPY *.*C:\
BOS.EXE
PME16.EXE
SCANDISK.EXE
SCANDISK.INI
AUTOEXEC.BAT
BOSCHECK.EXE
        6 FILE(S) COPIED
```

```
A:\IMAGE>CD\
```

```
A:\>
```

```
A:\>
```

7. At the A:\> prompt, type **C:**, then ENTER.
8. Type **PME16**, then ENTER.

9. The Protected Mode Program screen displays. Verify that a "cold start - initial" message is displayed in the middle of the screen and LED D2 is blinking on the CPU assembly.
10. Press ESC to exit the program and power down.
11. Carefully remove the cable from J1 and J10 to prevent cracking the connector housing. Install the program label on the end of DiskOnChip opposite the serial number.

### E.8.2 Reprogramming the DiskOnChip

Reprogram the DiskOnChip using the following instructions.

1. Install either the programmed DiskOnChip into socket U1 on the CPU assembly (noting the orientation of pin 1) or install the complete CPU assembly into card cage.
2. Plug the floppy drive cable into J10 on the CPU assembly and the keyboard cable into J1 on the CPU assembly.
3. Turn on the power. The CPU assembly reboots and displays the Systems Configuration window. The speaker on the CPU will chirp and the monitor will prompt

"ENTER NEW DATE (mm-dd-yy)". Press ENTER

"ENTER NEW TIME:". Press ENTER.

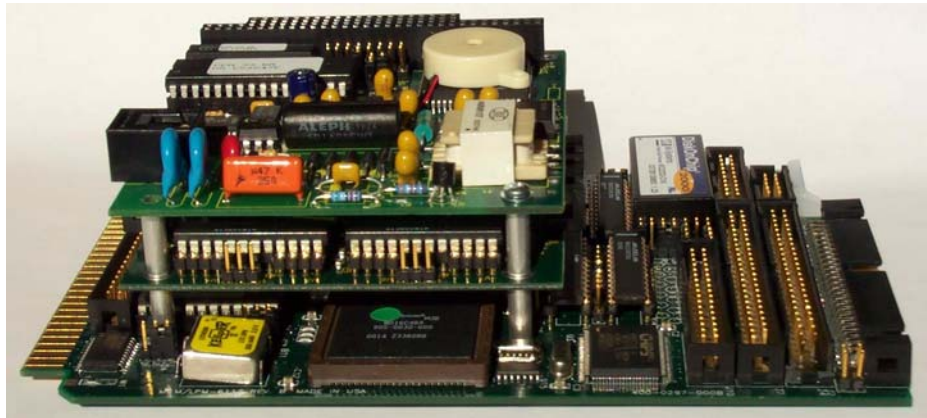
The A:\> prompt displays. Verify that the programming disk is the current revision specified on the work order package and insert into the floppy drive. Type C:, then ENTER to change to the 'C' drive.



4. After the C:\> prompt is displayed, type **ERASE \*.\***, then press ENTER. When prompted "ARE YOU SURE?" Type **Y**, then press ENTER.
5. At the C:\> prompt, type **DIR**, then press ENTER. Verify that only the Command.com file remains on the 'C:' drive, that the file size is 54,645 bytes, and that there are 16,105,472 bytes free.
6. Type **A:**, then ENTER to change back to the A:\ drive. Type **INSTALL**, then follow Steps 6 through 11 (see Section E.8.1).

### E.8.3 GC Reassembly

Use the following instructions to reassemble the GC Controller (CPU, PC/104 Bus and the Modem).



*Figure E-1 CPU, PC/104 and Modem*

1. Place and securely plug the WinSystems CPU Board into slot number 2 of the Card Cage Assembly.
2. Reconnect all ribbon cables that were unplugged.

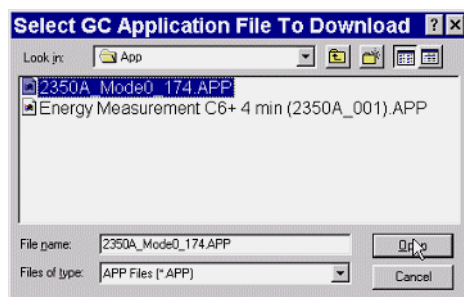
3. Return and secure the Card Cage Assembly back into the chassis mounting. Tighten the four screws.
4. Return and secure the field wiring TB to the original position. Tighten the six screws.
5. Reconnect the AC power cord to J21 on the TB, and restore AC power to the GC Controller.

## E.9 CONNECT TO GC FOR UPGRADED APP.

1. Use MON2000 software to connect with the GC unit.

Use the *File > Connect* menu to access this function. See [Section 2.10.1](#) for more information.

2. Use MON2000 to download the newly upgraded GC application to the connected GC Controller.
  - (a) Use the *File > Download* menu to access the Download CG Application File dialog.



- (b) Click the desired .bin file. The file name appears in the *File name* data field.
- (c) Click the  button or press the ENTER key to download the selected application file to the connected GC unit. A progress bar displays, indicating the completion status.

## **E.10 GUIDE TO STANDARD APPLICATION FILES**

This section of the appendix lists the various standard application, or BIN files that have been released by for the GC Controller.

### **E.10.1 Importance of Standard Application Files**

After a new GC Controller has been loaded with a standard application, the standard application is customized by the entry of timed events, component table entries, and other operator entered information consistent with the performance characteristics of the chromatograph hardware to which the Controller is connected and the needs of the user. Thus the standard application becomes a user application and differs from the factory-released, standard application from which it originated.

At the time when software is upgraded, including application files, it becomes important to know which factory-released standard application formed the basis of the user application, so the user application can be upgraded, too, with newer version of the standard application file.

You can determine which standard application formed the basis of the current user application by inspecting various MON2000 screens while connected to the GC (in most cases, you need only inspect the System dialog).

### E.10.2 Standard Applications v1.50 and Later

If you are using a GC Application that is version 1.50 or later, you can quickly determine the original standard application name by viewing the variables listed in the System dialog.

Use the *Application > System* menu to access this dialog. In the System dialog, (see [Table E-2](#)) find the value for the variable named CFG Base Name, and locate it in the column labeled “CFG Base Name”, then read the “Analyzer Name (BIN file)” to determine the application BIN file name.

*Table E-2 System Variables for Standard Application Files*

<b>Analyzer Name (BIN file)</b>	<b>Unit Type</b>	<b>CFG Base Name</b>	<b>System Description</b>	<b>Max. Archive Averages</b>	<b>Stream Sequence</b>
2350_001	2350	USASTD1	2350 Standard 1, 64 avgs	64	8
2350_002	2350	USASTD2	2350 Standard 2, 32 avgs	32	8
2350_003	2350	USASTD3	2350 Standard 3, 128 avgs	128	5
2350_006	2350	USASTD6	2350 Std 6, 32 avgs, 10 strs	32	10
2350_007	2350	USASTD7	2350-7 12Str, 128 Avg, 260Mbus	128	12
2350ISO1	2350	ISOSTD1	2350 ISO Std 1, 64 avgs	64	8
2350ISO2	2350	ISOSTD2	2350 ISO Std 2, 32 avgs	32	8
2350ISO3	2350	ISOSTD3	2350 ISO Std 3, 128 avgs	128	8
2350FI02	2350	USSTDFILE02	12 stream with files	204	12
2360_001	2360	USADUAL1	2360 test applica- tion	64	8
2350EXMB	2350	USSTDFILE01	Extended Modbus 4 strm plus cal	150	5
2360ISO1	2360	ISODUALSTD1	2360 ISO Std 1, 64 avgs	64	8

- **Standard BTU applications use the BIN files 2350\_001, 2350\_002, and 2350\_003 for 64, 32, and 128 averages respectively.**
- **The Extended Modbus application uses BIN file 2350EXMB.**
- **The standard dual application uses BIN file 2360\_001.**

### E.10.3 Standard Applications Prior to v1.50

For versions of GC Applications prior to version 1.50, the CFG Base Name variable did not exist. Therefore, a combination of other variables must be inspected to determine the standard application that was used to formulate the current user application.

To determine the standard application used to create a user application prior to version 1.50, compare the values of three variables from the System dialog - Unit Type, Max Archive Averages, and System Description — with the values found in [Table E-2](#). You will also need to compare the maximum number of streams, which can be determined from the Streams option under the Application menu.

There is one more possible complication. If the variable System Description was edited, it may not be the same value as described earlier in [Table E-2](#). In such an instance, it would be impossible to distinguish between the 2350\_00n (i.e., USASTD1, USASTD2, and USASTD3) and 2350ISON (i.e., ISOSTD1, ISOSTD2, and ISOSTD3) applications.

To overcome this complication, you can inspect one more variable:

1. Use the *Application > User Defined > Selection* menu to access the Selection dialog.
2. In the Selection dialog, CVTABLE\_pri will be the first variable listed if the application is one of the ISO applications.

## APPENDIX F, MODBUS REG. LIST FOR 2350A GC

### F.1 INTRODUCTION – SIM\_2251 & USER\_MODBUS

GC Controller Modbus registers that may be of interest to the developer are of two varieties, SIM\_2251 and User\_Modbus. Differences are summarized in the following table.

*Table F-1 Comparison of SIM\_2251 and User\_Modbus*

SIM_2251	User_Modbus
Serial slave port.	Serial slave port.
Modified protocol that allows floating point numbers to be transmitted over Modbus via 2251 emulation slave type.	The standard Gould Modbus protocol that accommodates PLC Emulation LO-HI.
Nearly all register contents are predefined; a few 9000-series registers can be user-defined (i.e., read-write).	Boolean (coils) are predefined. Numeric (registers) are user-defined.
Variables assigned to registers can be listed in contents of a PC-Config Report (for instructions, <a href="#">see Section 2.16.3</a> ; for an example report, <a href="#">see Appendix A</a> ,). For more detail about register contents, <a href="#">see Section F.2.1</a> .	Variables assigned to registers can be listed in contents of a PC-Config Report (for instructions, <a href="#">see Section 2.16.3</a> ; for an example report, <a href="#">see Appendix A</a> ,). Boolean (coils) contents also listed in <a href="#">Section F.2</a> .
When using the Modbus Test software, set <i>Register Mode</i> to “DANIEL” to view register contents ( <a href="#">see Section 10.2.3</a> ).	When using the Modbus Test software, set <i>Register Mode</i> to “PLC LH” to view register contents ( <a href="#">see Section 10.2.3</a> ).

#### F.1.1 NOTES ON USER\_MODBUS

[Section F.2](#) lists only variables included in the User\_Modbus Boolean Modbus registers. These registers are not user-defined and primarily contain alarm flags, possibly useful for debugging purposes. To use the Modbus Test software to view the contents of these registers, you will need to set the *Function* parameter to “1 (Read Coil)”. [See Section 10.2](#) through [Section 10.4](#) for details on using the Modbus Test software.

All other User\_Modbus registers can be defined by the user. To define User\_Modbus register contents (through assignment of variables), see [Section 5.18.4](#).

To obtain a complete list of register assignments, both SIM\_2251 and User\_Modbus, use Model 700 to produce a PC-Config Report.

## NOTICE

To print a PC-Config Report, see [Section 2.16.3](#); for an example report, see [Appendix A](#), [Section F.2](#) and [Section F.2.1](#).

### F.1.2 NOTES ON SIM\_2251 MODBUS

To use the Modbus Test software and view the contents of SIM\_2251 registers, you will need to set Register Mode to “Daniel”, as noted in [Table F-1](#).

To obtain a complete list of register assignments, both SIM\_2251 and User\_Modbus, use MON2000 to produce a PC-Config Report.



## F.2 USER MODBUS REGISTER LIST

Slave Name USER\_MODBUS

MODBUS Reg.	Variable Name	Field Name	Indices S	Indices C	
-----					
Boolean (Coils)					
0	sysalarm_set		1	1	Application Checksum Failure
1	sysalarm_set		2	1	ROM Checksum Failure
2	sysalarm_set		3	1	RAM Diagnostics Failure
3	sysalarm_set		4	1	A/D Converter Failure
4	sysalarm_set		5	1	Detector Oven Failure
5	sysalarm_set		6	1	Liquid Sample Valve Heater Failure
6	sysalarm_set		7	1	Sample System Oven Failure
7	sysalarm_set		8	1	Catalytic Converter Failure
8	sysalarm_set		9	1	Heater 5 Failure
9	sysalarm_set		10	1	Heater 6 Failure
10	sysalarm_set		11	1	Heater 1 Controller Failure
11	sysalarm_set		12	1	Heater 2 Controller Failure
12	sysalarm_set		13	1	Heater 3 Controller Failure
13	sysalarm_set		14	1	Heater 4 Controller Failure
14	sysalarm_set		15	1	Heater 5 Controller Failure
15	sysalarm_set		16	1	Heater 6 Controller Failure
16	sysalarm_set		17	1	FID Flame out
17	sysalarm_set		18	1	Warmstart Calibration Failure
18	sysalarm_set		19	1	Valve Timing Failure
19	sysalarm_set		20	1	Excess Response Factor Deviation
20	sysalarm_set		21	1	M200 Invalid Non-Volatile Data
21	sysalarm_set		22	1	M200 Invalid A Module Data
22	sysalarm_set		23	1	M200 Invalid B Module Data
23	sysalarm_set		24	1	M200 Bad Options
24	sysalarm_set		25	1	M200 Stack Overflow
25	sysalarm_set		26	1	M200 Hardware Shutdown
26	sysalarm_set		27	1	M200 Synchronization Failure
27	sysalarm_set		28	1	Preamp Input 1 Out of Range
28	sysalarm_set		29	1	Preamp Input 2 Out of Range
29	sysalarm_set		30	1	Preamp Input 3 Out of Range
30	sysalarm_set		31	1	Preamp Input 4 Out of Range
31	sysalarm_set		32	1	Preamp Failure
32	sysalarm_set		33	1	Analog Output 1 HIGH
33	sysalarm_set		34	1	Analog Output 2 HIGH
34	sysalarm_set		35	1	Analog Output 3 HIGH
35	sysalarm_set		36	1	Analog Output 4 HIGH
36	sysalarm_set		37	1	Analog Output 5 HIGH
37	sysalarm_set		38	1	Analog Output 6 HIGH
38	sysalarm_set		39	1	Analog Output 7 HIGH
39	sysalarm_set		40	1	Analog Output 8 HIGH
40	sysalarm_set		41	1	Analog Output 9 HIGH

41	sysalarm_set	42	1 Analog Output 10 HIGH
42	sysalarm_set	43	1 Analog Output 11 HIGH
43	sysalarm_set	44	1 Analog Output 12 HIGH
44	sysalarm_set	45	1 Analog Output 13 HIGH
45	sysalarm_set	46	1 Analog Output 14 HIGH
46	sysalarm_set	47	1 Analog Output 15 HIGH
47	sysalarm_set	48	1 Analog Output 16 HIGH
48	sysalarm_set	49	1 Analog Output 1 LOW
49	sysalarm_set	50	1 Analog Output 2 LOW
50	sysalarm_set	51	1 Analog Output 3 LOW
51	sysalarm_set	52	1 Analog Output 4 LOW
52	sysalarm_set	53	1 Analog Output 5 LOW
53	sysalarm_set	54	1 Analog Output 6 LOW
54	sysalarm_set	55	1 Analog Output 7 LOW
55	sysalarm_set	56	1 Analog Output 8 LOW
56	sysalarm_set	57	1 Analog Output 9 LOW
57	sysalarm_set	58	1 Analog Output 10 LOW
58	sysalarm_set	59	1 Analog Output 11 LOW
59	sysalarm_set	60	1 Analog Output 12 LOW
60	sysalarm_set	61	1 Analog Output 13 LOW
61	sysalarm_set	62	1 Analog Output 14 LOW
62	sysalarm_set	63	1 Analog Output 15 LOW
63	sysalarm_set	64	1 Analog Output 16 LOW
64	sysalarm_set	65	1 Analyzer Failure
65	sysalarm_set	66	1 Power Failure
66	sysalarm_set	67	1 Fused Peak Overflow - Noisy Baseline
67	sysalarm_set	68	1 CPU Battery Low
68	sysalarm_set	69	1 GC Idle
69	sysalarm_set	70	1 Real-Time Clock Failure
70	sysalarm_set	71	1 Analog Input 1 HIGH
71	sysalarm_set	72	1 Analog Input 2 HIGH
72	sysalarm_set	73	1 Analog Input 3 HIGH
73	sysalarm_set	74	1 Analog Input 4 HIGH
74	sysalarm_set	75	1 Analog Input 1 LOW
75	sysalarm_set	76	1 Analog Input 2 LOW
76	sysalarm_set	77	1 Analog Input 3 LOW
77	sysalarm_set	78	1 Analog Input 4 LOW
78	sysalarm_set	79	1 NA
79	sysalarm_set	80	1 NA
80	sysalarm_set	81	1 NA
81	sysalarm_set	82	1 NA
82	sysalarm_set	83	1 NA
83	sysalarm_set	84	1 NA
84	sysalarm_set	85	1 NA
85	lmtalarm_set	1	1
86	lmtalarm_set	2	1
87	lmtalarm_set	3	1
88	lmtalarm_set	4	1
89	lmtalarm_set	5	1

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90	lmtalarm_set		6	1	
91	lmtalarm_set		7	1	
92	lmtalarm_set		8	1	
93	lmtalarm_set		9	1	
94	lmtalarm_set		10	1	
95	lmtalarm_set		11	1	
96	lmtalarm_set		12	1	
97	lmtalarm_set		13	1	
98	lmtalarm_set		14	1	
99	lmtalarm_set		15	1	
100	lmtalarm_set		16	1	
101	lmtalarm_set		17	1	
102	lmtalarm_set		18	1	
103	lmtalarm_set		19	1	
104	lmtalarm_set		20	1	
105	stream_data	stream_togg	1	1	Stream 1
106	stream_data	stream_togg	2	1	Stream 2
107	stream_data	stream_togg	3	1	Stream 3
108	stream_data	stream_togg	4	1	Stream 4
109	stream_data	stream_togg	5	1	Stream 5
110	stream_data	stream_togg	6	1	Stream 6
111	stream_data	stream_togg	7	1	Stream 7
112	stream_data	stream_togg	8	1	Stream 8
113	doutcur		1	1	
114	doutcur		2	1	
115	doutcur		3	1	
116	doutcur		4	1	
117	doutcur		5	1	

F.2.1 SIM\_2251 MODBUS REGISTER LIST

**NOTICE**

The information in the following tables is derived from engineering specification number ES-17128-005, "Model 2251 Enhanced Specification Chromatograph Controller Modbus Communication Indices" and has been updated for the 2350A GC Controllers.

G.3 (continued) SIM\_2251 MODBUS REGISTER LIST

Reg. No.	Description
3001	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #1
3002	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #2
3003	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #3
3004	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #4
3005	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #5
3006	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #6
3007	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #7
3008	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #8
3009	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #9
3010	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #10
3011	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #11
3012	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #12
3013	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #13
3014	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #14
3015	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #15
3016	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #16
3017	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #1
3018	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #2
3019	Component Table <i>n</i> (where <i>n</i> = CDT # used during last run) - Component Index #3

G.3 (continued) SIM_2251 MODBUS REGISTER LIST	
Reg. No.	Description
3020	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #4
3021	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #5
3022	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #6
3023	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #7
3024	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #8
3025	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #9
3026	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #10
3027	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #11
3028	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #12
3029	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #13
3030	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #14
3031	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #15
3032	Component Table $n$ (where $n$ = CDT # used during last run) - Component Index #16
3033	Analysis Time (in 1/30ths of 1 second)
3034	Current Stream
3035	Mask of streams associated with Component Table #1 (Bit $2^n = 1$ implies stream $n$ included)
3036	Current Month(1-12)
3037	Current Day(1-31)
3038	Current Year(0-99)
3039	Current Hour(0-24)
3040	Current Minutes(0-59)
3041	Cycle Start Time - Month
3042	Cycle Start Time - Day
3043	Cycle Start Time - Year
3044	Cycle Start Time - Hour
3045	Cycle Start Time - Minutes

G.3 (continued) SIM_2251 MODBUS REGISTER LIST																
Reg. No.	Description															
BIT NUMBER																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3046	checksum failure	anlyzr failure	D/A 3 high	D/A 3 low	D/A 2 high	D/A 2 low	D/A 1 high	D/A 1 low	spare	spare	A/D 2 high	A/D 2 low	A/D 1 high	A/D 1 low	spare	spare
3047	spare	spare	spare	spare	spare	spare	spare	spare	spare	spare	spare	spare	adjust preamp	preamp failure	rf % dev	power fail
3048	stream number 1															
		#15 low	#14 low	#13 low	#12 low	#11 low	#10 low	#9 low	#8 low	#7 low	#6 low	#5 low	#4 low	#3 low	#2 low	O.D.A #1 low
3049	stream number 1															
		#15 high	#14 high	#13 high	#12 high	#11 high	#10 high	#9 high	#8 high	#7 high	#6 high	#5 high	#4 high	#3 high	#2 high	O.D.A #1 high
3050	stream number 2															
		#15 low	#14 low	#13 low	#12 low	#11 low	#10 low	#9 low	#8 low	#7 low	#6 low	#5 low	#4 low	#3 low	#2 low	O.D.A #1 low
3051	stream number 2															
		#15 high	#14 high	#13 high	#12 high	#11 high	#10 high	#9 high	#8 high	#7 high	#6 high	#5 high	#4 high	#3 high	#2 high	O.D.A #1 high
3052	stream number 3															
		#15 low	#14 low	#13 low	#12 low	#11 low	#10 low	#9 low	#8 low	#7 low	#6 low	#5 low	#4 low	#3 low	#2 low	O.D.A #1 low
3053	stream number 3															
		#15 high	#14 high	#13 high	#12 high	#11 high	#10 high	#9 high	#8 high	#7 high	#6 high	#5 high	#4 high	#3 high	#2 high	O.D.A #1 high
3054	stream number 4															
		#15 low	#14 low	#13 low	#12 low	#11 low	#10 low	#9 low	#8 low	#7 low	#6 low	#5 low	#4 low	#3 low	#2 low	O.D.A #1 low
3055	stream number 4															
		#15 high	#14 high	#13 high	#12 high	#11 high	#10 high	#9 high	#8 high	#7 high	#6 high	#5 high	#4 high	#3 high	#2 high	O.D.A #1 high
3056	stream number 5															
		#15 low	#14 low	#13 low	#12 low	#11 low	#10 low	#9 low	#8 low	#7 low	#6 low	#5 low	#4 low	#3 low	#2 low	O.D.A #1 low
3057	stream number 5															
		#15 high	#14 high	#13 high	#12 high	#11 high	#10 high	#9 high	#8 high	#7 high	#6 high	#5 high	#4 high	#3 high	#2 high	O.D.A #1 high
3058	New data flag. Set upon completion of calculations.															

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G.3 (continued) SIM_2251 MODBUS REGISTER LIST	
Reg. No.	Description
3059	Cal/Analysis flag. Set = 1 if analysis data. Set = 0 if calculation data.
32-BIT INTEGERS	
5001	Cycle Time (in 1/30ths of 1 second)
5002	Calibration Cycle time (in 1/30ths of 1 second)
FLOATING POINT (proposed - IEEE KCS Standard Format)	
<b>NOTE:</b> The following registers will contain 0 (zero) values until at least one analysis run has occurred.	
7001	Mole % - Component #1
7002	Mole % - Component #2
7003	Mole % - Component #3
7004	Mole % - Component #4
7005	Mole % - Component #5
7006	Mole % - Component #6
7007	Mole % - Component #7
7008	Mole % - Component #8
7009	Mole % - Component #9
7010	Mole % - Component #10
7011	Mole % - Component #11
7012	Mole % - Component #12
7013	Mole % - Component #13
7014	Mole % - Component #14
7015	Mole % - Component #15
7016	Mole % - Component #16
7017	GPM or Weight % - Component #1
7018	GPM or Weight % - Component #2
7019	GPM or Weight % - Component #3
7020	GPM or Weight % - Component #4
7021	GPM or Weight % - Component #5

G.3 (continued) SIM 2251 MODBUS REGISTER LIST	
Reg. No.	Description
7022	GPM or Weight % - Component #6
7023	GPM or Weight % - Component #7
7024	GPM or Weight % - Component #8
7025	GPM or Weight % - Component #9
7026	GPM or Weight % - Component #10
7027	GPM or Weight % - Component #11
7028	GPM or Weight % - Component #12
7029	GPM or Weight % - Component #13
7030	GPM or Weight % - Component #14
7031	GPM or Weight % - Component #15
7032	GPM or Weight % - Component #16
7033	BTU - Dry
7034	BTU - Saturated
7035	Specific Gravity
7036	Compressibility
7037	WOBBE Index
7038	Total Unnormalized Mole %
7039	Total GPM
7040	Calculation, User Defined 1
7041	Calculation, User Defined 2
7042	Calculation, User Defined 3
7043	Calculation, User Defined 4
7044	Calculation, User Defined 5
7045-7053	Unused
7054	Actual BTU
7055	Average, User Defined 1



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G.3 (continued) SIM 2251 MODBUS REGISTER LIST	
Reg. No.	Description
7056	Average, User Defined 2
7057	Average, User Defined 3
7058	Average, User Defined 4
7059	Average, User Defined 5
7060	Average, User Defined 6
7061	Average, User Defined 7
7062	Average, User Defined 8
7063	Average, User Defined 9
7064	Average, User Defined 10
7065	Average, User Defined 11
7066	Average, User Defined 12
7067	Average, User Defined 13
7068	Average, User Defined 14
7069	Average, User Defined 15
7070	First Archive of Average, User Defined 1
7071	First Archive of Average, User Defined 2
7072	First Archive of Average, User Defined 3
7073	First Archive of Average, User Defined 4
7074	First Archive of Average, User Defined 5
7075	First Archive of Average, User Defined 6
7076	First Archive of Average, User Defined 7
7077	First Archive of Average, User Defined 8
7078	First Archive of Average, User Defined 9
7079	First Archive of Average, User Defined 10
7080	First Archive of Average, User Defined 11
7081	First Archive of Average, User Defined 12
7082	First Archive of Average, User Defined 13

G.3 (continued) SIM 2251 MODBUS REGISTER LIST	
Reg. No.	Description
7083	First Archive of Average, User Defined 14
7084	First Archive of Average, User Defined 15
7085	Analog Input #1 - Current Value in Engineering Units
7086	Analog Input #2 - Current Value in Engineering Units
7087	Actual BTU (last calibration)
7088	Dry BTU (last calibration)
7089	Sat BTU (last calibration)
7090	Wobbe Index (last calibration)
7091	Relative Density (last calibration)
7092	Compressibility (last calibration)
7093	Total GPM (last calibration)
7094	Total Unnormalized (last calibration)
7095-7110	Response Factors (#1-16), Component Table <i>n</i> (where <i>n</i> = CDT # used during last run)
7111-7126	Response Factors (#1-16), Component Table <i>n</i> (where <i>n</i> = CDT # used during last run)
7127-7162	Averages, User Defined 1-36 (NOTE: First fifteen, or registers 7127-7141, are repeats of contents of registers 7055-7069)
7163-7198	Maximum values from Averages, User Defined 1-36
7199-7234	Minimum values from Averages, User Defined 1-36
7235-7270	First (most recent) Archive of Averages, User Defined 1-36 (NOTE: First fifteen, or registers 7235-7249, are repeats of contents of registers 7070-7084)
7271-7306	First (most recent) Archive of Maximum values from Averages, User Defined 1-36
7307-7342	First (most recent) Archive of Minimum values from Averages, User Defined 1-36
7343-7378	Second Archive of Averages, User Defined 1-36

G.3 (continued) SIM 2251 MODBUS REGISTER LIST	
Reg. No.	Description
7379-7414	Second Archive of Maximum values from Averages, User Defined 1-36
7415-7450	Second Archive of Minimum values from Averages, User Defined 1-36
7451-7486	Third (oldest) Archive of Averages, User Defined 1-36
7487-7522	Third (oldest) Archive of Maximum values from Averages, User Defined 1-36
7523-7558	Third (oldest) Archive of Minimum values from Averages, User Defined 1-36

G.3 (continued) SIM 2251 MODBUS COMMUNICATION INDICES					
Reg. No.	Description: RW = read/write (1) or read-only (0) LEN = length REGS = number of Modbus registers required				
	RW	TYPE	LEN	REGS	VARIABLE NAME, POINTER, or DESCRIPTION
9001	0	string	6	3	device model number
9004	0	string	4	2	software revision
9006	1	integer	2	1	system time month (1-12)
9007	1	integer	2	1	system time day (1-31)
9008	1	integer	2	1	system time year (0-99)
9009	1	integer	2	1	system time hour (0-23)
9010	1	integer	2	1	system time minutes (0-59)
9011	1	integer	2	1	system time seconds (0-59)
9012	1	integer	2	1	system time day (0-6)
9013	0	integer	2	1	plug id (Modbus or Device ID, per DIP switch settings)
9014	1	long	4	2	site id
9016	0	string	12	5	device serial number
9022	0	integer	2	1	analysis time 1
9023	0	integer	2	1	analysis time 2 (for dual detector system)
9024	0	integer	2	1	cycle time 1

G.3 (continued) SIM 2251 MODBUS COMMUNICATION INDICES					
Reg. No.	Description: RW = read/write (1) or read-only (0) LEN = length REGS = number of Modbus registers required				
	RW	TYPE	LEN	REGS	VARIABLE NAME, POINTER, or DESCRIPTION
9025	0	integer	2	1	cycle time 2 (for dual detector system)
9026	0	integer	2	1	run time 1
9027	0	integer	2	1	run time 2 (for dual detector system)
9028	0	integer	2	1	current stream 1
9029	0	integer	2	1	current stream 2 (for dual detector system)
9030	0	integer	2	1	system mode 1
9031	0	integer	2	1	system mode 2 (for dual detector system)
9032	0	integer	2	1	calibrating 1
9033	0	integer	2	1	calibrating 2 (for dual detector system)
9034	0	integer	2	1	active alarm (red light at GC controller)
9035	0	integer	2	1	unack'd alarm (yellow light at GC controller)
9036	0	integer	2	1	hourly average reset - year
9037	0	integer	2	1	hourly average reset - month
9038	0	integer	2	1	hourly average reset - day
9039	0	integer	2	1	hourly average reset - hour
9040	0	integer	2	1	hourly average reset - minutes
9041	0	integer	2	1	24-hour average reset - year
9042	0	integer	2	1	24-hour average reset - month
9043	0	integer	2	1	24-hour average reset - day
9044	0	integer	2	1	24-hour average reset - hour
9045	0	integer	2	1	24-hour average reset - minutes
9046	0	integer	2	1	weekly average reset - year
9047	0	integer	2	1	weekly average reset - month
9048	0	integer	2	1	weekly average reset - day
9049	0	integer	2	1	weekly average reset - hour

G.3 (continued) SIM 2251 MODBUS COMMUNICATION INDICES					
Reg. No.	Description: RW = read/write (1) or read-only (0) LEN = length REGS = number of Modbus registers required				
	RW	TYPE	LEN	REGS	VARIABLE NAME, POINTER, or DESCRIPTION
9050	0	integer	2	1	weekly average reset - minutes
9051	0	integer	2	1	monthly average reset - year
9052	0	integer	2	1	monthly average reset - month
9053	0	integer	2	1	monthly average reset - day
9054	0	integer	2	1	monthly average reset - hour
9055	0	integer	2	1	monthly average reset - minutes
9056	0	integer	2	1	variable average reset - year
9057	0	integer	2	1	variable average reset - month
9058	0	integer	2	1	variable average reset - day
9059	0	integer	2	1	variable average reset - hour
9060	0	integer	2	1	variable average reset - minutes

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To make a warranty claim, you, the Purchaser, must:

1. Provide Daniel Measurement and Control, Inc. or Rosemount Analytical, Inc. with proof of the Date of Purchase and proof of the Date of Shipment of the product in question.
2. Return the product to Daniel Measurement Services (DMS) within 12 months of the date of original shipment of the product, or within 18 months of the date of original shipment of the product to destinations outside of the United States. The Purchaser must prepay any shipping charges. In addition, the Purchaser is responsible for insuring any product shipped for return, and assumes the risk of loss of the product during shipment.
3. To obtain warranty service or to locate the nearest DMS office, sales office, or service center, call (713) 827-6314, fax a request to (713) 827-6312, or write to:

Daniel Measurement Services  
11100 Brittmore Park Drive  
Houston, Texas 77041

You can also contact DMS via [www.emersonprocess.com/daniel](http://www.emersonprocess.com/daniel).

4. When contacting DMS for product service, the Purchaser is asked to provide information as indicated on the following page entitled "Customer Repair Report".
5. For product returns from locations outside the United States, it will be necessary for you to obtain the import consignment address so that DMS's customs broker can handle the importation with the U.S. Customs Service.
6. DMS offers both on call and contract maintenance service designed to afford single source responsibility for all its products.
7. DMS reserves the right to make changes at any time to any product to improve its design and to insure the best available product.

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INVOICE ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

SHIPPING ADDRESS: \_\_\_\_\_

\_\_\_\_\_

RETURN SHIPPING METHOD: \_\_\_\_\_

EQUIPMENT MODEL #: \_\_\_\_\_ S/N: \_\_\_\_\_ FAILURE DATE: \_\_\_\_\_

DESCRIPTION OF PROBLEM: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

WHAT WAS HAPPENING AT TIME OF FAILURE? \_\_\_\_\_

\_\_\_\_\_

ADDITIONAL COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

REPORT PREPARED BY: \_\_\_\_\_ TITLE: \_\_\_\_\_

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